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LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CXLVI. No. 2923.] LONDON, MAY 20, 1919. [71ST YEAR. PRICE 8d.

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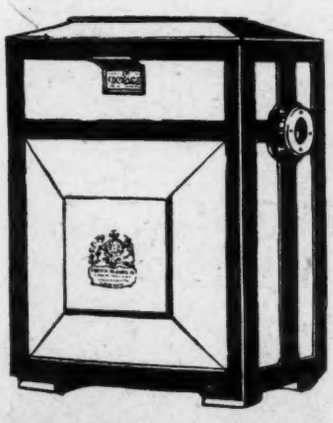

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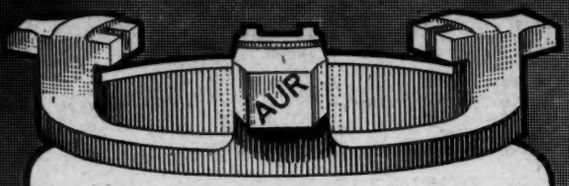

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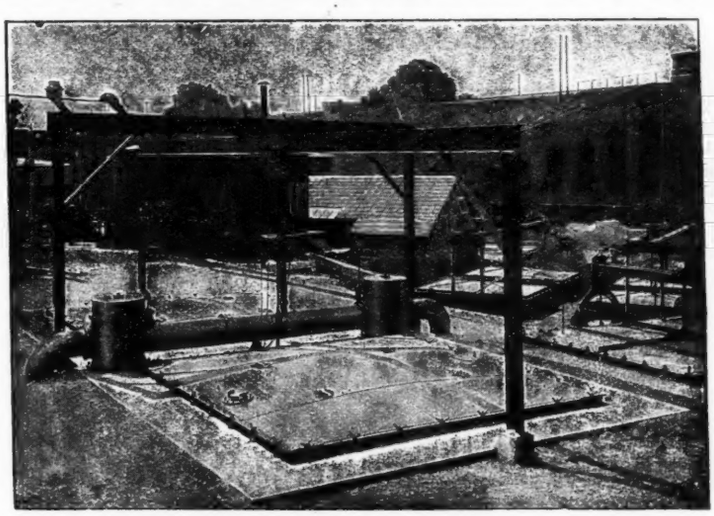

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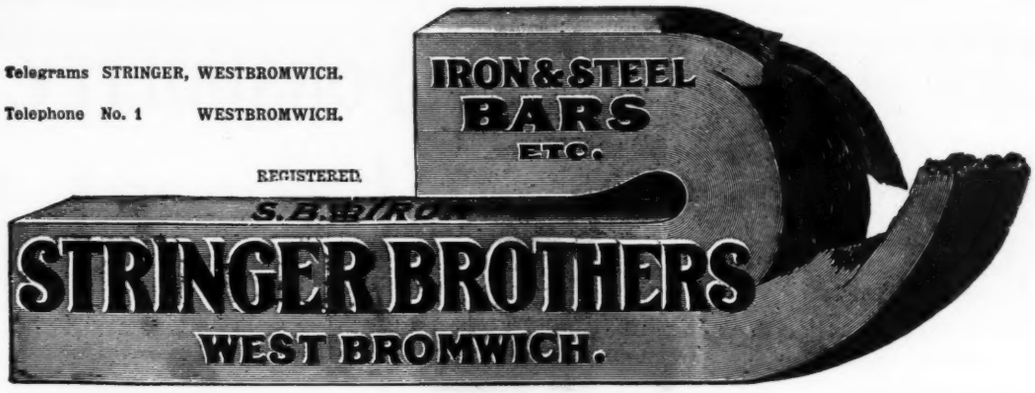

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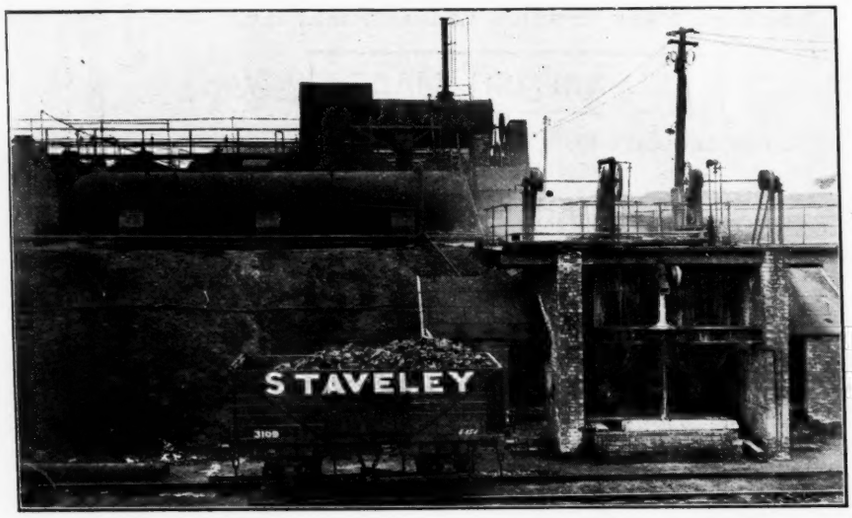

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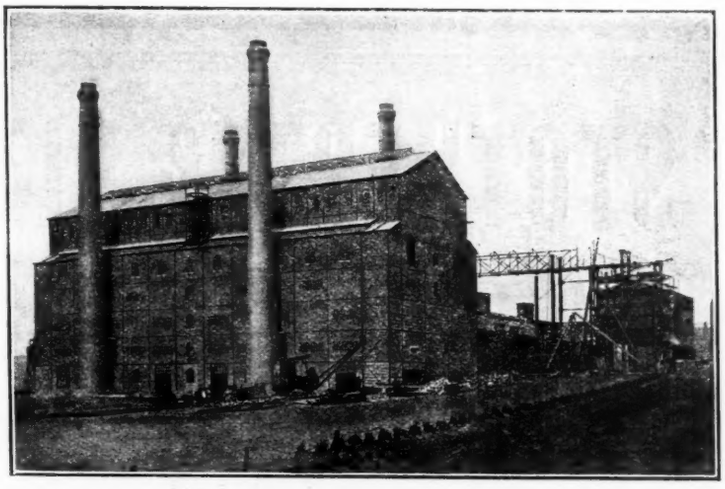

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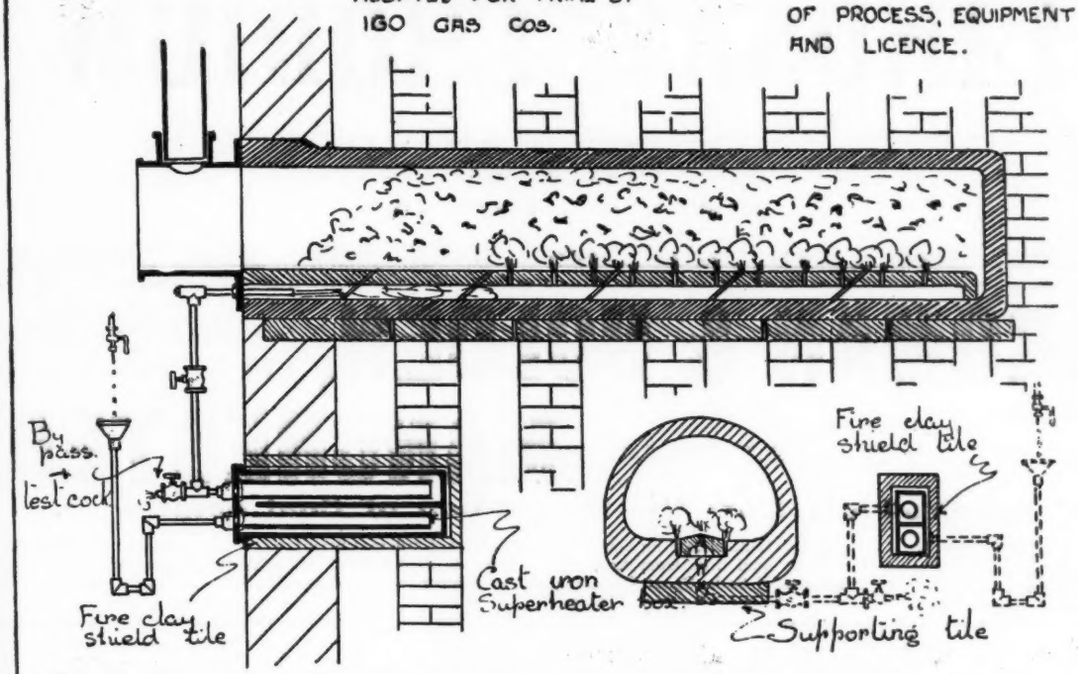

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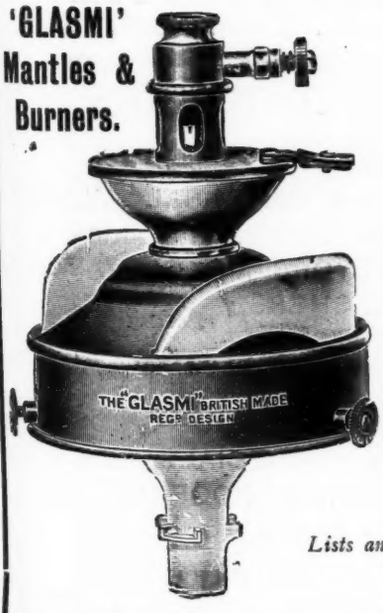

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CONTENTS.

EDITORIAL NOTES.

Behind Events of Vital Importance to the Industry 423
Opening the Eyes of the Government. . . 424
Revision of the Industry's Financial Enactments 424
The Electricity Scheme and "Any Form of Energy" 425
City and Guilds of London Examinations—Unopposed Bills Committee and 400 B.Th.U. Gas—Sacrificing Economy—A Significant Endowment—Transport and the Gas Industry—Fuel Exports and Values . 426
National Gas Council of Great Britain and Ireland 427
Annual Report of the Institution Council. . 427
Electricity Supply Memoranda 429
Personal 431
Spiral-Guided Gasholders 432
Torbay Paint Company's Specialities. . . 432
Masonic—Evening Star Chapter 432
The Sulzer Process of Tar Distillation . . 433
Need for Uniform Gas Supply Pressures. . 434
Heavy Oil for Benzol Extraction 434
Gas Equipment in Relation to National Housing Schemes. By R. J. Rogers . . 435
War Time Extraction of Bye-Products in France. 437
Blackpool Conference of the B.C.G.A.—Gas Equipment in Relation to Housing Problems. By Samuel Tagg 438
American Views on Municipal Ownership . 439
Production of Gas from Lignite. 439

REGISTER OF PATENTS.

Furnace Roofs—Fletcher, J. E. 440
Distillation of Coal—Lamplough, F., and Oil Extractors, Ltd. 440
Retorts—Rew, R. J. 440
Laying Pipes Underground—Alley, S. E. . 441
Gas-Heating Apparatus—Allen, W. J. . . . 441
Applications for Patents 441

PARLIAMENTARY INTELLIGENCE.

House of Lords—
Progress of Bills. 441
House of Commons—
Progress of Bills. 441
Huddersfield Corporation Gas Bill. . . . 441

LEGAL INTELLIGENCE.

Household Fuel and Lighting Order Prosecution—Excessive Use of Gas 441

MISCELLANEOUS NEWS.

Training the Returned Soldier—Birmingham Day School for Demobilized Gas-Fitters . 442
Australian Gas-Light Company—Half-Yearly Meeting 442
Bombay Gas Company, Ltd. 442
Ottoman Gas Company, Ltd. 443
Sir Hallewell Rogers's Resignation . . . 444
Arsenical Poisoning from Coal Products . . 444
Current Sales of Gas Products 445
Stafford Gas Undertaking 447
Southampton Gas Company. 447
Stock Market Report 448

PARAGRAPHS.

Temporary Increase of Charges Act—Use of Wood for Lighting Gas in Germany—Purification of Gas-Works Waste Water . 427
A Norwegian Process 434
Spent Oxide in the Manufacture of Sulphuric Acid 437
Glasgow Wages Arbitration—Stourport Gas Company's Arbitration—South Staffordshire Mond Gas Company—Trouble at the Ormskirk Gas-Works—Gas Estimates at Manchester—Gas-Workers' Hours . . . 446
Proposed New Gas-Works for Carlisle—Leicester Corporation Gas Accounts—Export of Coal—Dukinfield Gas Department . . 447
Torbay and Dart Paint Company, Ltd.—Sequel to Nechells Gas Accident—Fatal Accident at the Vauxhall Gas-Works . . 448

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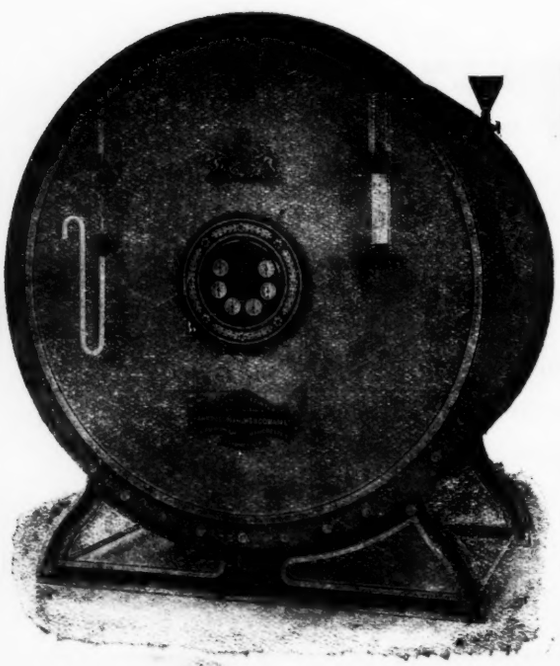

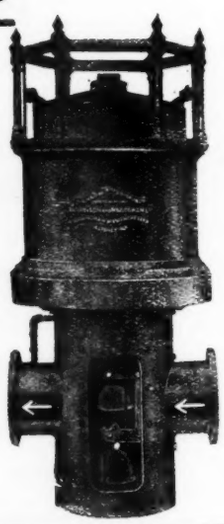

TRACINGS AND SPECIFICATIONS ON APPLICATION.

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GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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EDITORIAL NOTES.

Behind Events of Vital Importance to the Industry.

INVESTIGATION work has very properly become one of the chief functions of the Institution of Gas Engineers, and in this, as a technical organization, it fills a better sphere of usefulness than expending time upon matters which its constitution and authorization disqualify it to see through. Such matters are much better left to the National Gas Council upon which the Institution has representation, and which has power that the Institution does not possess. In its investigation work, the Institution has during the war been labouring under considerable disadvantages, though there has at times been evident a little impatience at the slowness with which practical result has been forthcoming. But it is only fair to assume that this has been due to unyielding circumstance. The present position, however, declares very clearly that technical organization in the gas industry has been very backward in systematically keeping readily available data records abreast of contemporary work and knowledge. Had there been continuous research, and proper and methodical compilation not only of the results of co-operative but of individual work, we should not have had the gas industry so much in arrear of movements that are being made in other directions. Data would have been immediately accessible for use in reporting upon questions which are to the industry of vital importance; and we should not have been so handicapped as we have been in meeting fresh situations as they arise. Being unprepared is one of the things for which the gas industry has been quite famous.

In the annual report of the Council of the Institution, reference is made to the valuable report on coal conservation prepared by Sir Dugald Clerk, Prof. Arthur Smithells, and Prof. J. W. Cobb; and it states that the report has been forwarded to the National Gas Council, with a covering letter, in order that "it may be placed, with any supple-"ment, before the Government and the Ministry of Recon-"struction, as representing the considered views of the gas "industry." The covering letter is dated April 26, 1919. The Power Sub-Committee's report of the Coal Conservation Committee of the Ministry of Reconstruction is dated April 16, 1917—two full years before—and it was noticed in the "JOURNAL" in December the same year. About the time of the completion of the report of the Power Sub-Committee, the Board of Trade Electric Power Committee was appointed. It reported several months ago; and the Board of Trade has since been busily engaged in preparing a Bill for the reconstruction of the electricity industry, and conferring upon it preferential advantages. Almost simultaneously with the introduction of the Bill into Parliament, the report prepared by Sir Dugald Clerk and his collaborators saw the light of day. Upon the preparation of the National Electricity Bill, therefore, the report could not have had any influence whatever; and, therefore, as before urged in the "JOURNAL," no steps and no expense should be spared to see (if not too late) that the utmost benefit is now derived from the report in influencing consideration of the Bill in Committee by putting it in the possession of not only the Government, but members of Parliament. For the report being belated, we do not blame in any way those who have carried through the heavy work of preparing it. War time and other urgent engagements were against any rapid progress over such extensive fallow ground. Chiefly blameworthy in our opinion is the want of a system of concise technical record on the part of the Institution, which would have been of inestimable value to Sir Dugald and his colleagues. They had to labour under all disadvantages that could possibly be imposed upon them by an unkind fate.

Then, again, the Board of Fuel Research has now been in existence for some time; and the reference to them by the Board of Trade as to gas standards, inerts, and pressure has been matter of general knowledge in the industry. The Gas Investigation Committee of the Institution and the Leeds University have meantime been very busy exploring the behaviour of different qualities of gas under certain conditions of use. The information derived has been valuable; but, so far as the Board of Fuel Research report is concerned, it has had no positive effect. "Inerts" need only be mentioned as an example. The Board have already made their report to the Board of Trade. Now it appears the Gas Investigation Committee have "to some extent" switched-off from the work on which they were engaged to what they regard as "the pressing necessity from the point "of view of the industry of securing definite and reliable "information as to efficiency in use of a gas lower in calo-"rific value than what is normal in the gas practice of "to-day; and for this purpose Mr. Wood has carried out "experiments on heating and lighting at the Uddingston "Gas-Works." The results of this work will be presented at the annual meeting of the Institution; while the report of the Board of Fuel Research bears the date of Jan. 29 last, and has been public property for over a month. Still another branch of research has now been "committed to "the care of the Sub-Committee. This is an inquiry into "the comparative efficiencies of different methods of pro-"ducing gas, with special reference to methods for which "higher efficiencies than those of current practice were "claimed." Tests have been begun; but the Committee believe that it would be premature to attempt to report on this subject until a reasonable time has been given for obtaining results. This work would also have been valuable in connection with the report of the Board of Fuel Research and that of Sir Dugald Clerk, Prof. Smithells, and Prof. Cobb. We do not blame the Committee for not having the work completed and the results available. What we do blame is the evidence that all this shows of lack of foresight and enthusiasm (or if the foresight exists, action is not taken upon it) that permits a march of events vital to the interests of the industry, without the industry being prepared with evidence and data which would be of supreme importance in helping to mould the opinion of the Government and their advisers. It must not be forgotten that the industry is now being assisted by the Board of Trade and the Coal Controller by being allowed to carry on its work, under severely onerous circumstances, with a relaxation of statutory conditions. The period of grace will shortly expire; and the industry will again have to rely upon the indulgence of the Board of Trade to enable it to continue to work as economically as possible to the advantage of the consumers, until definite action is taken upon the report of the Fuel Research Board. The influence of the report, and that alone, and not anything that the industry has directly done, can save gas undertakings from a return to the old statutory standards (which are condemned for their uneconomic restrictions); and this would again cause an upheaval in the working conditions of the industry, which would be reflected in the wave of further gas price increases that would pass over the country.

However, enough for the time being as to the propensity for being behind the times and events. In the letter to the the National Gas Council which accompanied the report of Sir Dugald Clerk and his colleagues, it is properly pointed out that the Council should supplement the report by representation on other matters, which are suggested in this

extract from the letter: "The financial economy derivable "from the carbonization of coal in gas-works relative to "its consumption in electrical generating stations has not "been dealt with, neither have any recommendations been "made on the lines of suggestions put forward for the "creation of a Board of Electricity Commissioners and the "general supply of electricity to the country from gigantic "electric super-generator stations." We attach great importance to these matters. It does not need any profound consideration of the point to show that the setting-up of a body of Electricity Commissioners, with what will be tantamount to plenary powers (subject simply to ratification by Parliament) will confer a preference upon the electricity industry of great intrinsic value to it. The Commissioners will be permanent; they will have special qualifications; their knowledge of electrical requirements will develop; their proceedings will have continuity; there will be no claim upon them to consider the interests of any other industry; they will devote themselves exclusively to the electrical. These are significant considerations. If there be no equivalent change for the gas industry, its affairs will still be subject to the decisions of ephemeral Select Committees, without any technical qualifications, however intent upon doing justice. What they have done in the past has been largely condemned by the more competent tribunal—the Board of Fuel Research, who (even with their superior competence) have made slips which require amendment, unless much of their intention is to be rendered nugatory. These various considerations have no doubt already occurred to the National Gas Council, and have been acted upon in forwarding copies of the report to the proper quarters. However, the lesson we wish to draw from the experiences to which we have referred in this article, and to impress upon the chief technical organization of the industry, is that the systematic recording of technical data which marks development in any and every direction of the industry's work would enable it to be better prepared for eventualities, and to deal with them in a more expeditious manner than is the case at present—largely because, as things are, a preliminary necessity (before anything useful can be done) is a vast research.

Opening the Eyes of the Government.

The Electricity Supply Bill has had its second reading; but the general tenor of the debate which followed the opening statement of the Home Secretary (Mr. Shortt) indicated that in Committee the Bill will have to undergo radical alterations if the members are to be appeased who have studied the matter, who represent a large body of electrical and public opinion, and who severely criticized the measure. Practically the whole of the debate consisted of adverse criticism. The proposals were riddled through and through; and if the Government are not possessed by a childlike faith in the Committees who have reported to them, they must feel an uncomfortable uncertainty as to whether the scheme after all is all it has been represented to be, and whether it is going to succeed in its destined mission. If there was a guarantee that the scheme, whatever happened, would be self-supporting—that the rates charged for electricity would be sufficient to cover all outgoings—we should be inclined to say, so far as the gas industry is concerned, "Let the scheme go forward." National interests, however, claim that a check shall be put on legislation of this kind. Mr. Shortt proved himself an apt pupil. His speech showed that he had been well-tutored in all the fiction with which the scheme has been clothed in order to give it a plausible appearance; and he unconsciously proved up to the hilt the gullibility of the Government in a matter about which they technically know nothing. The scheme is, according to the view of the Government, going to work miracles. It is going to cheapen power, rejuvenate industries, enable fresh industries to be set up, increase production, warrant the payment of higher wages, put electricity at disposal for domestic cooking and heating, clarify the atmosphere—in fact, it is going to cure practically all the ills from which we suffer, and a new heaven on earth is to be created. So, stated briefly, ran the case for the Bill. We have heard it all before, *ad nauseam*. Mr. Shortt and the Government were severely admonished for making all this promise without advancing any practical facts. The whole fabric of their case lacks definite support; and when asked for guarantees that promises were going to be fulfilled, they had nothing to offer, beyond misty references to concentration, superstations, and so forth cheapening the cost of generation. But there was nothing whatever as to the offsets that are obvious to technical men. Mr. Shortt boasted of excellent guidance. The boast was a bit premature.

The critics see nationalization and a super-"DORA" in the scheme for the electricity industry; and this is causing apprehension. They foresee an industry over-loaded with capital. They criticized the financial parts of the scheme, and the municipal spokesmen deplored the intentions of the Government not to constitute the District Boards solely of local public representatives, but to have a hybrid composition. The Government were also warned that there must be losses the first few years, and that it would be quite impracticable to make the receipts cover expenditure. If there are to be losses for years, then it follows that for years there cannot be any lower prices for electricity. The country will kick against having to bear the losses in the interests of the manufacturers; and the manufacturers will rebel against unfulfilled promises. If there are losses it should be understood that these must be made good from the business in future. All companies have to meet their own charges during the period of development; and they are the losers if income does not meet capital expenditure and leave some surplus for capital charges. There is no reason whatever why electricity should receive special treatment over other industries in the cause of manufacturers. The competing gas industry, though utilizing coal to greater national advantage, has never had consideration from the Government in such a way. On the contrary, it has always been treated to the severest rigidity, to the detriment of its power for national good. There is no ground whatever for electricity supply receiving preferential treatment. Mr. Gerald Balfour (who protested against fallacious assumptions emanating from the mouth of the Government as to ridiculously cheap electricity resulting from the scheme) showed by illustration drawn from several other industries that the cost of electric power only represents figures which work out to a fraction of 1 p.ct. up to some 2 p.ct. of the turnover, which reminds of Sir Dugald Clerk's statement at the recent meeting of the Society of British Gas Industries, that in America the cost of power is only between 3 and 6 p.ct. of total works' costs.

This being so, how on earth can there be, upon what is now paid for electric energy, any appreciable reduction through this tremendously costly electricity scheme, which is going to so vastly increase capital and other charges? And assuming there is a modicum of reduction, how is it going to perform all the wonders predicted for it? Never has there been such a mass of foolishness opposed to hard facts. Equally does this apply to the predictions as to the marvellous effects that electricity is going to have upon domestic heating and cooking. Even electricians laugh at the political simplicity that has been so plentifully spread before the public. At the present time an average of something like 54,000 B.Th.U. are expended in obtaining a unit of electricity (some 3420 B.Th.U.); and the most sanguine expectation of the advisers of the Government is that about 2 lbs. of coal (say, 27,000 B.Th.U.) will, in the most favourable circumstances, have to be expended, to secure this 3420 B.Th.U. And those "most favourable "circumstances" do not exist except in favoured industrial areas; so that the great part of the country which is residential cannot hope to secure energy obtained on even these thermal terms. If they could, the waste of the thermal energy of the coal for cooking and heating would be enormous; the cost something that the vast majority of the population could never afford, and immensely more than the cost to them of other agents. Withal, we have Ministers of the Crown inviting the country to believe that they are going to work the impossible. Experience will again be proved to be the mistress—we will not say as the proverb does "of fools," but of credulous politicians.

Revision of the Industry's Financial Enactments.

It is a pity that the address which Mr. Jacques Abady delivered recently to the North of England Gas Managers' Association [*ante*, p. 290] was not prepared by him before the meeting, so that it could have been published *in extenso*, instead of only a condensed transcript from a shorthand writer's notes. Though the address was in almost every part of a controversial nature, and many men will without premeditation disagree with Mr. Abady, the subjects dealt with are all highly pertinent to the position in which the

gas industry finds itself to-day. Such products of a thinking mind on these subjects deserve to be adequately discussed and weighed, so as to ascertain whether there is any measure of real value in them. But one hesitates to criticize, unless one is altogether certain that the author's suggestions are fully and correctly presented in the printed report.

However, the suggestions made by Mr. Abady, as we have remarked, are pertinent to the position of the industry to-day; and no one else has as yet ventured to the same extent on this particular constructive path. It is Mr. Abady's intimate association with the gas industry, supplemented by his legal learning and experience, that has led him to explore some of the legislative changes that are demanded by the new economic situation of the industry; and while changes are being made, they had better be of a thorough order. One of the industry's great faults (the plural can be safely used) is that it has—submissively bowing to the stereotyped ideas of Parliament—allowed itself to be tied to legislative precedent, and has shown little of that initiative or inventive faculty which is necessary to harmonize legislation with internal developments and potential external service. The effect of this has been felt throughout all the operations of the industry, as Lord Moulton (keen observer that he is) so aptly and truly pointed out in his Institution address close upon a year ago. Now the industry has come to a stage at which it must consider what should be done legislatively to render statutory conditions compatible with the new economic conditions, internal development, and the larger service foreshadowed in the report of the Board of Fuel Research. The two things must be dealt with together. They are inseparable. It is not merely a question of obtaining greater freedom in the production of gas which will enable the industry to make still better use of the coal it carbonizes and to perform more extensive service in the national interests; but these and the change in economic environment will necessitate the overhauling of the financial conditions of the industry, as Sir Albert Stanley predicted some time ago would have to be the case with all statutorily controlled concerns. While revision is proceeding, if the brains attached to the industry can invent something better than the old and more or less arbitrarily fashioned grooves, which have so long fixed gas undertakings in a worse position than any other trading undertakings, so much the better. It is because of this that, whether or not there is agreement with Mr. Abady, we welcome his suggestions, as, at any rate, they mark the places where financial revision is needed, and they supply fresh matter for consideration. When the questions are settled that are raised in the report of the Board of Fuel Research, and the financial revision which must accompany the settlement has been accomplished, then will be the time to construct a new General Gas Act which will eliminate all that is obsolete in the General Acts now applying to the industry, and incorporate in one the clauses that remain, with all the generally applicable provisions that now regularly appear in Special Acts (and incidentally add to the cost of every individual application to Parliament, because of their absence from the General Acts), together with the enactments to which the current situation gives birth.

Mr. Abady's suggestions for financial revision should not be dismissed without due deliberation. Upon two or three of them comment, however, may be made, subject to fresh argument allowing, if warranted, a change of conviction. It seems to Mr. Abady that, if we are to step from volume to heat units as the basis of price, it would be an anachronism that the dividend-earning capacity of a company should be founded upon the price charged to the ordinary consumer; and his idea is that the gas industry should make up its mind that the sliding-scale, being based on the price of gas, should be on the average price to all consumers. This is suggested on the ground that it is important that every incentive should be given to an undertaking to supply gas as cheaply as possible, and in large quantity for industrial purposes. On first blush, there may not appear to some to be the slightest objection to this proposal, save that it is not at all likely Parliament would give the advantage of the average price without at the same time lowering the standard and maximum prices, which at their present levels have proved so disastrously inadequate under the cost fluctuations to which the gas industry has been in recent years subject, and which fluctuations there is small chance will, in the new normal times, be kept within the limits of the old normal times. Moreover, there would be a great difference in the average price as between a rich industrial district and a purely residential district, even assuming the two districts harmonize in all other trading conditions—such as distance from coalfields, and gross and net costs of coals. Furthermore, the industrial consumption of gas has not that steadiness—owing to changes in the market conditions—that the consumption of private customers has. So that the average price—the total revenue divided by the quantity of gas sold—in respect of any one undertaking with a good industrial load might show some sprightly variations, which would not be to the liking of gas shareholders, who before the war looked to some regularity in the earning power of their invested capital. Ordinary consumption supplies the more stable basis; and, therefore, it seems to us that a standard price fixed in relation to the ordinary price, and dividend gradations based upon it, would afford greater security for the shareholders' return. The average price, too, would supply a temptation in some industrial areas to give industrial consumption larger benefit in price reductions than the ordinary consumption, if it would affect the average price more rapidly to the advantage of the shareholders. There are several considerations other than those advanced by Mr. Abady; and his average price proposal might need some safeguards in order to protect all classes of consumer. However, these are not to be regarded as definite views, but first-sight considerations.

An alternative is suggested by Mr. Abady—the basing of the sliding-scale upon the average receipts per ton of coal carbonized; and, if this were done, the standard price could be made to slide with the ton of coal. The instability of the average receipts per ton of coal is again an objection. Dr. Carpenter has suggested that the standard price should be made variable according to the price of coal. There is less objection to this—in fact, there is much to be said for it—compared with Mr. Abady's proposal to adopt the average receipts per ton as the basis. The question of the sliding-scale being subject to the price of coal has been previously discussed in the "JOURNAL." [See April 1 last, p. 20, and Jan. 29, 1918, p. 191.] Though the proposal does not give absolute protection, coal is the item of expenditure that is the heaviest, and the one subject to the greatest variation through uncontrollable causes; so that it is undoubtedly the best single factor to take in determining the slide of the standard price.

Among other suggestions, Mr. Abady proposes that gas undertakings should universally ask that a certain part of the surplus profits over the standard dividend should be payable to the management and the shareholders, and a certain proportion as a statutory right to the employees. This, as it stands, is vague; and we much doubt whether Parliament would agree to payments, supplementary to dividends based on a sliding scale in the manner here indicated. At the present time, too, Parliament does not interfere with the remuneration of management; and it seems to us better that the endorsement of Parliament should not be asked to any arrangement in this regard. A profit-sharing scheme for employees, in which all officers and employees can share, has already received the sanction of Parliament; and there are in existence instances of local authority gas undertakings that (above wages) give their employees a "picking" out of profits. The redemption out of revenue of a certain proportion of redeemable stock is likewise advocated. The circumstances of the times justify this. Mr. Abady would have another tilt at the one-third residuals purchasing restriction. If Parliament is true to its professions, and desires home industries to work on the most economic bases, this one-third restriction should be promptly removed. Other points dealt with in the address were the features of the report of the Fuel Research Board and the Government's electrical proposals. It was a good address, being composed of constructive suggestions, though we do not anticipate that any one of its components will receive universal approval. But it is through the avenues of thought and discussion that more perfect ends are reached.

The Electricity Scheme and "Any Form of Energy."

There is a provision in the Electricity Supply Bill, of which particular note should be made by the National Gas Council, and especially of the words which we have italicized. It is Sub-Section 2 of Clause 15: "A District Electricity Board and any company or person may, with the consent of the Electricity Commissioners, enter into arrangements for the utilization, for the purposes of the Board, of water power, waste heat, or other form

of energy which the company or person may be able to dispose of, or *for the supply by the Board of any form of energy other than electricity;* and, where such an arrangement has been made, the District Electricity Board may be authorized by special order to exercise such powers as may be necessary for conveying such energy." It seems to us that an attempt should be made to specially exclude gas from "any form of energy other than electricity."

City and Guilds of London Examinations.

Mention is made in the report of the Council of the Institution of Gas Engineers of the fact that, with a few specified exceptions, the City and Guilds of London Institute have decided to abandon gradually in England and Wales all examinations lower than the final. In the official circular issued by the Institute dealing with the subject, it is intimated that, at a series of conferences held between representatives of the Board of Education and the Institute, with reference to the future of the examinations in England and Wales of the Institute's Department of Technology, the Board's representatives expressed the opinion that examinations by external bodies tend to interfere with the satisfactory working of the system of instruction in grouped courses of allied subjects, and that, in so far as the Institute's examinations are external, they conflict with the policy of the Board as regards technical education. An agreed scheme has been the result of the efforts of the Executive Committee of the Institute to meet the Board's views by some modification of their system of examinations. This year the examinations will be held in all grades as hitherto. In 1920 Grade I. in all three-grade and two-grade subjects will be discontinued; but students who have passed in Grade I. in a three-grade subject in a previous year, will be able to proceed to Grade II. Then, in the following year (1921), the final examination alone, except in a few cases, will be held. Further, the scheme provides that marks be given for school work and for home work, and are to be taken into account in the examination results. This, it is felt, will tend to modify the external character of the Institute's examinations. The hope is expressed in the circular that the abandonment of the lower examinations will not result in depressing the present standard of the Institute's final certificates, which has a recognized value in professional and industrial life.

Unopposed Bills Committee and 400 B.Th.U. Gas.

The Unopposed Bills Committee do not appear to have heard of the report of the Board of Fuel Research; or, if they have done so, they are disinclined to accept its teachings and advice, or perhaps they do not yet regard the time as ripe for acting upon the latter. The Stocksbridge Gas Bill has been (as reported last week) before the Committee. It will be remembered that the promoting Company do not contemplate erecting works of their own, but are going to take gas from a large coke-oven plant in the neighbourhood; and so it is not possible to guarantee a gas of more than 400 B.Th.U. The Company therefore put the standard at that figure. The Committee have allowed this, but only so long as the Company do not themselves manufacture gas. If the Company become gas makers on their own account, the standard is to be the 500 B.Th.U. one which has become petrified by parliamentary practice, and condemned for universal application by the Board of Fuel Research. The country is talking of coal conservation, and of national economy. The realization by gas undertakings of the largest thermal value possible from coal within the limits set by serviceability is essential in the national interests. The Unopposed Bills Committee still pull the cloak of precedent round them, and ignore the lessons of advancing knowledge.

Sacrificing Economy.

If the Company manufacture gas, the Unopposed Bills Committee say, in effect, they are to be blocked from producing gas on the most economical terms by being confined to a minimum 500 B.Th.U. gas, when the standard price is to be raised from 4s. to 5s. This decision as to standard price acknowledges that the 500 B.Th.U. gas must be dearer, and that a 400 B.Th.U. gas could be sold at a lower figure. If 500 B.Th.U. gas was supplied at 5s., the consumer would receive for 1d. a quantity of gas which on combustion would give him 8333 B.Th.U. If he is supplied with 400 B.Th.U. gas at 3s. 4d., the consumer would receive 10,000 B.Th.U. for 1d. If this gas can be (as it is to be at Stocksbridge) supplied at 2s. 6d., the consumer will receive 13,333 B.Th.U. for 1d. Supposing that the Company for any reason had to construct works of their own, and by the aid of charge steaming or admixture of water gas with coal gas, could supply by means of 400 B.Th.U. gas more B.Th.U. for 1d. than by being restricted to 500 B.Th.U. gas, why should not consumers obtain the advantage? This is what scientific investigation and practices have been teaching the gas industry; and scientific men and common sense tell us that this, producing economy and efficiency, is the wise way. But not so the Unopposed Bills Committee of the House of Commons. This may seem strange, but is true; and our warrant for saying so is the decision in the Stocksbridge case. There is another aspect of the matter. Supposing the time comes when the Company will have to produce gas themselves, then the decision means that, after consumers become accustomed to 400 B.Th.U. gas, they are to be forced to use gas of 500 B.Th.U., which will cost them more. Moreover, the 400 B.Th.U. gas requiring less air for its combustion than 500 B.Th.U. gas, it is found that the thermal value of the two gases per volume of mixture is much the same. Through our legislators not understanding these matters, the industry, gas consumers, and coal conservation must all suffer. At any rate, that is what has been, and is still, happening.

A Significant Endowment.

Oil, like electricity, is a competitor of the gas industry for light, heat, and power. The oil-trading companies have ardent belief in the materialization of the great potentialities of oil by bringing scientific investigation to bear on their work. Three of the large British Companies—the Burmah, the Anglo-Persian, and the Anglo-Saxon—each contribute £50,000, and Viscount Cowdray and the Hon. Clive Parsons a fourth £50,000 for endowing a chemical school at the Cambridge University. A personal contribution from another source has added £10,000 to the £200,000. The endowment has great significance as coming from commercial rivals. Naturally their object is not to supplement the technical educational resources of the country, but jointly to reap benefit in their trading from research and the output of specially trained men. Not only their own industry but the nation generally will gain advantage from this endowment. Everything that increases the expanse of training-ground and of research is valuable.

Transport and the Gas Industry.

A clause has been added to the Ways and Communications Bill providing for a panel of experts to advise and assist the Minister in the exercise of his duties and powers. The panel of experts will represent undertakings and interests largely concerned in transport. The gas industry has heavy traffic by both land and sea; and on the panel of experts it should certainly have representation.

Fuel Exports and Values.

The exports of coal, coke, and patent fuel are creeping up; and their values have made remarkable flight. In the last four months the quantity of coal shipped was 11,507,536 tons, compared with 10,166,748 tons in the same period of 1918, and 11,258,287 tons in 1917. The values were: For the four months of 1919, £20,711,007; 1918, £14,239,589; and 1917, £14,560,667. It will be remarked that, though the quantity of coal shipped in the last four months was only 249,249 tons more than in the corresponding period of 1917, the value was greater by £6,150,340. The quantity of coke exported was larger than in the same months of 1918, but less than in those of 1917. The figures are: 1919, 372,274 tons; 1918, 318,442 tons; 1917, 423,626 tons. Top values, however, were obtained in the past four months. The total was £955,544, as compared with £650,651 in 1918, and £833,852 in 1917.

It is stated in the "Journal für Gasbeleuchtung" that German gas coals have a much lower average content of sulphur than English coals, and the percentage of hydrogen sulphide in the crude gas is correspondingly smaller. As much as 60 p.ct. of the hydrogen sulphide may be removed in the ammonia scrubbers. Assuming that 0·5 p.ct. of H_2S is present in the gas entering the oxide purifiers, it is estimated that 19,810 tons of sulphur per annum is recoverable in German gas works.

NATIONAL GAS COUNCIL OF GREAT BRITAIN AND IRELAND.

A MEETING of the Central Executive Board was held last Friday the 16th May.

The PRESIDENT (Mr. D. Milne Watson) reported the recommendations of the Sub-Committee on Management; and these were approved and adopted as follows:

Mr. W. J. Smith (Acting Secretary) to be appointed Secretary.

The present staff to be retained.

The leases of premises in Grosvenor Gardens to be acquired for the joint occupation of the Council and of various other bodies connected with the industry.

Unity of action in connection with parliamentary and other matters affecting the industry generally was considered; and the course of action which it was desirable to take was decided upon.

It was reported that a memorandum on the report of the "Fuel Research Board on Gas Standards" had been forwarded by the Council to the Board of Trade, making suggestions for amendment. This memorandum would be supplemented by a further statement with regard to the clauses in the report dealing with sulphur and cyanogen—these having been inserted after the draft of the report had been submitted to the Council.

The report of Sir Dugald Clerk, Prof. Smithells, and Prof. Cobb having been circulated to all members of the Council, it was stated that arrangements had been made for extra copies (at the price of 2s. 6d. each) to be supplied on application to the Institution of Gas Engineers. This report was considered, and arrangements were made to draw the serious attention of the Government to the position.

A communication from the Controller of Coal Mines regarding the price of gas oil and the diversion of coal supplies was submitted; and proceedings at a subsequent deputation to the Coal Mines Department were reported.

It was reported that a draft agreement for use under the "Joint Tar Scheme" between distillers and producers had been prepared and was to be considered by the Sub-Committee.

A report dealing with the import and export lists sent to the Council by the Statistical Department of the Board of Trade for criticism was submitted; and the recommendations contained therein were approved for forwarding to the Board of Trade.

Reports were submitted on the action which the Council had taken, and the course which it was proposed to pursue, in connection with the Ministry of Ways and Communications Bill and the Electricity Supply Bill.

The next meeting of the Board will be held on Wednesday of next week (the 28th inst.).

Temporary Increase of Charges Act.—The Local Government Board have received an application for an Order from the St. Ives (Cornwall) Corporation.

Use of Wood for Lighting Gas in Germany.—Quoting from the "Journal für Gasbeleuchtung," the "Technical Supplement" says that the use of wood in combination with coal for the production of lighting gas is becoming general in Germany. The extension of this practice is not to be attributed wholly to the shortage of coal. Wood has been found to offer certain advantages where the recovery of bye-products is carried out to the fullest extent. An official communication states, relative to the production of wood gas in Wurtemburg gas-works, that out of the 63 works 35 have already begun its manufacture. The extent to which it is used at present varies from 10 to 50 p.ct. Preference is given to resiniferous kinds of wood, and to logs or billets of not more than 10c. diameter. The best proportion of wood to coal in the retorts is said to be one to three. The heat value of such gas is between 3000 and 3500 units.

Purification of Gas-Works Waste Water.—At the March conference of the American Gas Association, Mr. L. R. Dutton described a simple process for clarifying the waste water from a 2 million c.ft. carburetted water-gas plant, which amounted to 1000 or 1500 gallons per 24 hours, to an extent that admitted of its discharge into a river without causing trouble. A concrete tank, 24 ft. by 16 ft. by 7 ft. deep, was divided by a partition into two unequal parts, one nearly twice the size of the other. Each part was fitted with three baffle-plates so arranged as to divide it into four equal compartments. The liquid was admitted to the first of the larger set, having been previously allowed to cool in a tank where it would deposit the heavier tars. The first two compartments acted as settling chambers, being empty; the next two were filters, containing layers of coke and breeze about 3 ft. thick; then two more settling chambers; and, finally, two filters of pebbles and coarse sand. At the outlet of the fourth compartment, a small stream—about 2 gallons per hour—of solution of commercial alum was added (10 lbs. alum to 50 gallons of water). The actual quantity was closely regulated to suit the liquid under treatment. The liquid was practically freed from colour and from tarry matter.

ANNUAL REPORT OF THE INSTITUTION COUNCIL.

THE report of the Council upon the work of the Institution of Gas Engineers during the year 1918-19 is a lengthy document from which it is only possible for us to take some extracts.

His Majesty the King has conferred the following honours upon members:

Companion of the Order of St. Michael and St. George: Lieut.-Colonel Arthur Smithells.

Companion of the Order of the Indian Empire: Lieut.-Colonel H. W. Woodall.

Order of the British Empire: Prof. John W. Cobb and Prof. Harold B. Dixon (Commanders); Mr. John Bond, Mr. Thomas Curr, and Mr. John Wilkinson, of Nottingham (Officers); Mr. E. V. Evans and Mr. L. F. Tooth (Members).

MEMBERSHIP.

The total membership at the close of the year 1918 was 854, compared with 873 the previous year.

The Council regret that the deaths of the following have to be recorded:

Members.—Arthur Andrew, Oldham; Thomas Berridge, Leamington; James Braddock, Radcliffe; Thomas Canning, Newport (Mon.); W. J. Carpenter, Great Yarmouth; Philip P. Channon, Haywards Heath; Douglas F. Colson, Weymouth; Andrew Dougall, Tunbridge Wells; Thomas H. Duxbury, South Shields; Charles Harrison, Accrington; John Lyne, Wexford; Jonathan Magrath, Cork; Thomas May, Richmond, Surrey; T. Ormiston Paterson, Birkenhead; John H. Penney, South Shields; Frank W. Rapkin, Dartford; John B. Scott, Cowdenbeath.

Associate Members.—Walter Parker, Ryde, Isle of Wight; W. Edney Pettigrew, Leeds.

Mr. Dougall and Mr. Paterson had both occupied the Presidential Chair. Mr. Berridge had served as Junior Vice-President, but unfortunately was obliged to resign, owing to failing health.

NATIONAL GAS COUNCIL.

The following have been appointed to represent the Institution on the Central Executive Board of the newly-constituted National Gas Council: The President (Mr. Samuel Glover), the Vice-Presidents (Messrs. Thomas Goulden and Thomas Hardie), and the Hon. Secretary (Mr. W. E. Price). As Mr. Price was subsequently elected Hon. Secretary of the Council, a Past-President (Mr. A. E. Broadberry) was elected as fourth representative.

INSTITUTION GAS RESEARCH FELLOWSHIP.

This Fellowship, tenable at Leeds University, which has been in abeyance during the war, has been revived by the appointment to it of Mr. Thomas Hanby, B.Sc. (First-Class Honours). He is engaged under the direction of Prof. Cobb, Livesey Professor, on an investigation on the decomposition of benzene and toluene and its bearing on carbonization.

The annual amount payable in connection with the Fellowship for the present year has been increased from £100 to £200.

AFFILIATION.

During the year 1918-19, the District Associations affiliated with the Institution have been represented on the Council as follows:

Eastern Counties Association. . .	Mr. J. H. Brearley, Longwood.
Irish Association.	Mr. H. W. Saville, Drogheda.
Manchester District Institution . .	Mr. G. S. Frith, Runcorn.
Midland Association	Mr. W. Chaney, Birmingham.
North British Association . . .	Mr. R. Muir, Galston.
North of England Association . .	Mr. R. Nelson, Hull.
South District Association . . .	Mr. W. B. Farquhar, Ilford.
Wales and Monmouthshire District Institution	Mr. J. E. Kenshole, Merthyr Tydfil.

CITY AND GUILDS OF LONDON INSTITUTE EXAMINATIONS.

Notice has been received that, as a result of a series of conferences between representatives of the City and Guilds of London Institute and of the Board of Education, the Institute have agreed to abandon in England and Wales all examinations lower than the final, with a few specified exceptions. In 1920, Grade I. in all three-grade and two-grade subjects will be discontinued; but students who have passed in Grade I. in a three-grade subject in a previous year will be able to proceed to Grade II. In 1921 the final examination alone, except in the few cases referred to above, will be held at all centres in England and Wales.

As these alterations affect the examinations in Gas Engineering, Gas Supply, and Gas-Fitting, in which the Institution are so closely interested, a conference on the matter took place with Mr. Leonard G. Killby, of the City and Guilds of London Institute. Representatives of the Joint Council of Junior Gas Associations attended, that Council having previously submitted to the Council of the Institution suggestions for a revision of methods of education and examinations. A scheme is now being drafted embodying

the conclusions arrived at, for the consideration of the Institution in due course.

The term of Mr. S. Glover's service as Examiner in Gas Engineering and of Mr. Hole's as Examiner in Gas Supply expires with the examinations of 1919; but under the circumstances mentioned above, they have consented to act for one more year. Mr. R. Halkett has resigned the position of Examiner in Gas-Fitting. The Council desire to record the Institution's appreciation of the services he has rendered. Mr. H. Kendrick kindly consented to be nominated as his successor, and has been accordingly appointed by the City and Guilds of London Institute.

Demobilization Committee.

This Committee, consisting of the eight District Members of the Council, with Mr. Robert G. Shadbolt as Chairman, report that they have continued to discharge the function remitted to them by the Council during the past year, so far as circumstances would permit. As a Committee, they have held three meetings during the year, although the work is carried out chiefly through the medium of the Chairman, assisted by individual members, according to the "locality" involved at the moment. Subsequent to the signing of the armistice, their labours have been lightened by the formation of the Demobilization, &c., Department of the Ministry of Labour and its various branches, with which the Committee have acted in conjunction whenever possible. As a consequence of the advent of this Department, comparatively few cases have been left for the Committee to deal with—some two dozen in number—and in the majority of these, satisfactory arrangements have eventually been made. Two cases of unusual difficulty remain unsettled; but it is hoped that these will be disposed of satisfactorily in a short time.

The Committee wish particularly to acknowledge the assistance given by the Technical Press, who have willingly fallen in with all suggestions made to them, and in some instances have brought cases to their notice. At the head of their advertisement columns the Press give special prominence to a request to advertisers to specially consider the claims of ex-service men. This is supported by a special letter from the Committee to those advertising such vacancies; and, in addition, a copy of the advertisements is forwarded weekly to the Appointments Department of the Ministry of Pensions at St. Ermin's Hotel. By these means, appointments are necessarily made which do not come within the cognizance of the Committee.

So far as the Committee can form an opinion, the gas industry generally is quick to respond to the claims of the ex-service man, particularly in regard to re-instatements, though cases occasionally arise in which the Committee consider something less than justice has been done. Such instances are fortunately rare. Nevertheless, they ought not to occur.

As the Committee may still be able to render assistance, they are prepared to continue their labours, if such is the desire of the Council.

Patent Law Amendment.

The Institution took part in a conference on this subject with a number of engineering and allied societies, with the ultimate result that a deputation communicated a number of recommendations to the Board of Trade, with a view to influencing the drafting of a new Bill; the Patent and Designs Bill of 1917 having been withdrawn.

Coal Conservation.

A report to the President of the Institution on Coal Conservation and the Coal Gas and Electrical Supply Industries of the United Kingdom, by Sir Dugald Clerk, K.B.E., Prof. Arthur Smithells, C.M.G., and Prof. John W. Cobb, C.B.E., was presented to the Council and adopted. It has been forwarded to the National Gas Council in order that it may be placed, with any supplement, before the Government and the Ministry of Reconstruction, as representing the considered views of the gas industry. With the report was a covering letter addressed to the President of the National Gas Council and signed by Mr. Walter T. Dunn, the concluding paragraph of which was as follows:

> The financial economy derivable from the carbonization of coal in gas-works, relative to its consumption in electrical generating stations, has not been dealt with, neither have any recommendations been made on the lines of the suggestions put forward for the creation of a Board of Electricity Commissioners and the general supply of electricity to the country from gigantic electric super-generator stations. It is submitted by the Institution of Gas Engineers as a technical body, that these considerations are for the National Gas Council, as representing the whole industry. The Council of the Institution of Gas Engineers desire to commend to the National Gas Council their opinion that the report as now submitted should be supplemented by the addition of such further representation as may arise from discussion of the considerations contained in this communication.

Life of Gas-Meters Research Committee.

Mr. J. G. Taplay has been appointed Chemist to the Committee.

The following subjects have been considered during the year: Standard guarantee clauses for gas-meter contracts; rationing of materials; proposed new standard sizes of dry meters; unaccounted-for gas; corrosion of dry meters; internal corrosion of mains and services.

Refractory Materials Committee.

The Committee report that very considerable progress has been made during the past year in several branches of their research. Two full-time assistants are now working under Dr. Mellor's instructions. Mr. Walter Emery has been employed during the whole period; and the services of Dr. Bradshaw have been secured since the cessation of hostilities.

A report on the corrosive action of flue-dust on fire-bricks was presented at the meeting of the Institution in October last, and further reports are now ready on the crushing strength of bricks and also of their contraction, in which the effect of altering the proportion of grog and of its grain size on these properties is illustrated.

Work was commenced before the war on the thermal conductivity of bricks of different porosity. This work was suspended when the call to the Flag took away the workers, but has been resumed, and is now nearly completed. The action of reducing gases on fire-bricks has been the subject of much work which is not yet ready for report. Determinations of the specific heat of silica materials at high temperature are also in progress. The parallel work for fire-bricks has been published.

The very considerable and length series of experiments made to determine the deterioration of fire-bricks in prolonged use has so far yielded different results from what were anticipated. After twenty times heating for periods of eight days, during three of which the temperatures were in the neighbourhood of 1280° C., the bricks were practically as good as at the beginning. In some cases the bricks improved with the prolonged treatment, showing that some fire-bricks as turned out by manufacturers can be improved with a more severe burning. Arrangements are now being made to repeat these experiments under more drastic conditions; but it is evident that there is no difficulty in obtaining bricks that will stand the ordinary temperatures of a retort-setting for an indefinite period, where not exposed in an excessive degree to flue-dust and corrosive chemical action.

Great delay has been experienced in obtaining moulds and apparatus for the manufacture of retorts by the "casting" process. Plant promised to be delivered in December last only arrived in April. It is, however, expected that 22 in. by 16 in. retorts made in this way will be in actual use in gas-works in the coming season.

Preliminary experiments have been made in the purification of fire-clay by the "osmose" process; and apparatus for testing the process on a working scale is on order, and promised to be supplied shortly. It will then be possible to compare clays so purified with those treated by the old-fashioned "washing-up" process. Negotiations are in progress with a firm of repute for the manufacture of goods from the clays so treated.

A very important and much needed work is the study of the best binding material for siliceous bricks and retorts. The experiments on the action of flue-dust show that the bond is first attacked. A number of firms have offered to supply the material, amounting altogether to about 8 tons, for this work. The Committee appreciate highly their readiness to assist in this way.

The Institution and the Society of British Gas Industries have each increased their contribution to the Committee for 1919 from £150 to £300, and the Privy Council Committee for Scientific and Industrial Research have been asked to increase their grant to £600 for 1919.

In the report presented to the Institution for 1917, reference was made to a movement for the formation of a Central Research Association representing all industries interested in the manufacture and use of refractory materials. The Committee formed for this purpose from the delegates of the Institutions and Societies ooncerned has not been able to agree on a basis of organization satisfactory to all the industries concerned. The Refractory Materials Section of the Ceramic Society, largely representing the manufacturers of these materials, and acting in conjunction with the Department of Scientific and Industrial Research, have now, however, formed a Research Association, with offices and Secretary in London, which will act in co-ordination with the Committees of the various industries using refractory materials, such as that of this Institution. This Association will receive grants from the Department of Scientific and Industrial Research; and it is hoped that much benefit will result to all industries concerned, including the gas industry.

The Council regret that Dr. Colman felt obliged to resign the position of Chairman of the Committee, owing to pressure of other work, and desire to acknowledge the valuable services he has rendered in that capacity. Mr. A. E. Broadberry has been appointed to succeed him.

Gas Investigation Committee.

The Gas Heating, Lighting, and Ventilation Research Committee of the Institution of Gas Engineers and the University of Leeds have continued to act during the past year as the Research Sub-Committee for the Gas Investigation Committee. Mr. Lawrence Hislop has been co-opted for the purpose of certain research work at Uddingston. The constitution of the Sub-Committee otherwise remains unchanged. Two branches of research have occupied the attention of the Committee during the past twelve months. The first of these was a continuation of the work concerning which a first and preliminary report has already been made, on the relative efficiencies in use of different grades of gas. Since that time the systematic survey, which necessitated in the first instance the comparative trial of different gases in appliances as they existed, has been amplified and extended to the inverted incandescent mantle by Mr. James W. Wood, Research Chemist. The work has, however, been diverted to some extent by what the

Sub-Committee regarded as the pressing necessity from the point of view of the gas industry, of securing definite and reliable information as to the efficiency in use of a gas lower in calorific value than what is normal in the gas practice of to-day. For this purpose Mr. Wood has carried out experiments on heating and lighting at the Uddingston Gas-Works. In this part of the work, simple modifications of the appliances were considered permissible, in order to enable the Sub-Committee to form as soon as possible an opinion which it was hoped would be of service.

Another branch of research committed to the care of the Sub-Committee has been an inquiry into the comparative efficiencies of different methods of producing gas, with special reference to methods for which higher efficiences than those of current practice were claimed. Mr. Lawrence Hislop and the Uddingston Gas Company kindly offered facilities for commencing this work on their installation of continuous vertical gas-retorts at Uddingston. Difficulties arising out of war conditions have had to be encountered in the provision of proper staff and apparatus, but Dr. Parker, the Research Chemist appointed by the Committee for this part of the investigation, was able to proceed to Uddingston at the beginning of February last, and since that time preparations have been completed, and the tests have begun. The Committee believe, however, that it would be premature to attempt to report on this subject until a reasonable time had been given for obtaining results.

In order to secure that these various inquiries should be carried out with efficiency and despatch, it has been found necessary to engage two Research Assistants, Mr. H. Kerr (appointed from Jan. 15), who holds the diploma in Fuel and Metallurgy of the University of Leeds, and Mr. F. S. Townend (appointed from March 10), of the Birmingham Corporation Gas Department, who holds the B.Sc. degree in engineering of the University of London. The Research Staff therefore consists now of Mr. James W. Wood and Dr. A. Parker as Research Chemists, and Mr. H. Kerr and Mr. F. S. Townend, Research Assistants, and the Committee would like to express its appreciation of the manner in which Mr. Wood has carried out his work during the year, and in which Dr. Parker, Mr. Kerr, and Mr. Townend have started upon their duties.

Finally, the Committee desire to acknowledge their indebtedness to the Birmingham Corporation Gas Department and to the Uddingston Gas Company for the facilities which they have provided.

The Gas Investigation Committee have considered the draft of a report on gas standards which was to be submitted by the Fuel Research Board to the Board of Trade, and prepared a memorandum on the matter for the information of the National Gas Council, who have made representations to the Board on the subject.

Federal Council for Pure and Applied Chemistry.

The Council have accepted an invitation for the Institution to become a constituent body of the Federal Council for Pure and Applied Chemistry, the objects of which are to advance, safeguard, and voice the interests of Chemical Science. Dr. H. G. Colman has consented to act as the Institution's representative.

British Association Fuel Economy Committee.

Mr. D. H. Helps, the representative of the Institution on this Committee, reported to the Council as follows on April 23, 1919:

A copy of the writer's first report appears on p. 88 of the "Transactions" of the Institution for the year 1917. In January of that year, the Government appointed a Board of Fuel Research, under the directorship of Sir George Beilby, F.R.S., which took over the work of the Fuel Economy Committee of the British Association, of which Prof. W. A. Bone, D.Sc., F.R.S., was Chairman. The work of the Committee was, therefore, suspended. But the information collected by them was no doubt of considerable value to the new organization. Prof. Bone was appointed Consultant to the Fuel Board, but retired from that position in October, 1918. In December, 1918, the British Association reappointed their Fuel Economy Committee, with powers to reorganize their programme and personnel; and at a subsequent meeting of the General Committee it was explained that the resuscitation of the work was the outcome of a widespread feeling for the need of an organized body of independent and disinterested scientific opinion which could be brought to bear in the public interest upon any proposal for research or public policy with regard to fuel, including such questions as coal control and distribution. The work of the Committee was not resumed with a desire to interfere in any way with the work of the Fuel Research Board, but with the object of, as it were, holding a "watching brief" in the interests of scientific research and the public welfare in regard to all questions or proposals arising in connection with Fuel Research, Coal Control, and Public Power Supplies, &c.

The Sub-Committees have been reorganized; and the Carbonization and Metallurgical Sub-Committees now form one Committee, constituted as follows: Sir Robert Hadfield (Chairman), Prof. J. O. Arnold, Mr. E. Bury, Mr. E. V. Evans, Mr. A. Hutchinson, Mr. Hollingworth, Mr. D. H. Helps, Mr. J. E. Stead, and Mr. H. Woodall.

This Committee are considering and investigating, *inter alia*, the following subjects; and the writer was requested to be prepared to communicate in writing to the Chairman of the Sub-Committee his views thereon: (1) Prospects of low temperature distillation of coal. (2) Results of recent experiments on steaming vertical gas-retorts. (3) Proposals for completely gasifying coal at gas-works and sending out mixtures of coal gas and water gas. (4) Future standards for public gas supplies.

In view of the work which is now being carried out by the Gas Investigation Committee of the Institution, whose final report has not yet been made public, and of the various experiments—particularly in connection with steaming in vertical retorts—now being conducted in several gas-works, the writer has not presented any further written report. He is, however, shortly attending a meeting of the Committee, when the subjects named above will be considered and discussed. Mr. H. Woodall and Mr. E. V. Evans (South Metropolitan Gas Company) have been co-opted members of the Executive Committee, and are also members of the Carbonization and Metallurgical Sub-Committee.

The Fuel Economy Committee will present a report at the next annual meeting of the British Association.

Canal Traffic.

The Institution continue their interest in the Waterways Association. The Association welcome the Transport Bill introduced by the Government, and its reference to canals, as recognizing the importance of dealing with transport on broad lines, but are strongly of opinion that, even if all methods of transport are to be under one Ministerial Department, the management of canals should be conducted by a distinct and separate administrative body or board.

THE BENEVOLENT FUND.

The Committee of Management of the Benevolent Fund report that the income of the fund for the year ended Dec. 31 last amounted to £498, and the expenditure to £371. Had it not been for the donations, a deficit of £4 would have appeared at the end of the year.

The Committee, therefore, are anxious that the list of regular annual subscribers should be augmented, so that the amount of the existing grants may be maintained, and provision made for the consideration of fresh applications as received. It should also be stated that the fund has recently suffered the loss of a number of subscribers by death. Grants to the number of fifteen have been voted by the Committee during the year. An earnest appeal is now made to every member of the Institution who is not a subscriber to support the fund, which has been the means of doing great good ever since its establishment in the year 1876.

The two members of the Committee retiring in order of rotation at the forthcoming annual meeting are Mr. J. Ferguson Bell, of Derby, and Mr. Charles F. Botley, of Hastings. The Committee have nominated Mr. S. Glover, of St. Helens, and Mr. J. Terrace, of London, for election as their successors.

ELECTRICITY SUPPLY MEMORANDA.

THE Electricity Supply Bill, which forms the foundation for a national scheme of electricity generation and supply to distributors, and to those not already enjoying the blessings of an electrical service, is anything but an instrument which will commend itself to present owners of electricity concerns, who are to be converted into mere outlets for the energy generated under a scheme without as yet any proved advantages to them. The danger that there will not be any benefit in the way of reduced costs lies in three directions: The first and paramount is that the prevailing economic conditions are opposed tooth and nail to the carrying through of any such scheme other than under most burdensome circumstances; the second is that the heavy amount of machinery that will be required in the shape of staff and offices and general expenses of the Electricity Commissioners and District Boards will be something superimposed upon the expenditure of the existing undertakings; and there is further the extra outlay upon distribution. There is good prospect here of this national scheme of electricity developing into a permanent monument to the error of working to plausible ideals without subjecting them carefully and completely to the test of practicability. Ideals do not necessarily mean real reform. If, however, these particular ideals are not productive of positive benefit to the country, what is lost by them will fortunately be discounted by the still better field of operation that will be spread before the gas industry. We have a very strong feeling that, with the section in the Bill which provides that the prices to be charged by the District Electricity Boards "shall be such that their receipts on income account will be sufficient to cover their expenditure on income account (including interest and sinking-fund charges), with such margin as the Electricity Commissioners may allow," the gas industry itself has very little to fear from the competition that will result from this development, especially if the financial assistance that is to be rendered by the Government is on terms bearing some equality with what other industrial concerns will now and in the immediate future have to pay for the capital they require.

The Bill.

The Control Over Charges.

The digest of the provisions of the Bill published in the "JOURNAL" last week, with an editorial comment, renders unnecessary any general survey of the provisions in the "Memoranda." It is a remarkable measure in the sweeping powers with which it invests the Electricity Commissioners and District Boards, with the temporary superior authority of the Board of Trade, who are to be, in this matter, supplanted by the Ministry of Ways and Communications. This

trinity will have absolute sovereignty over electrical generation as conducted at present under statutory authority. Statutory electricity distributors will have no option but to take their current from the statutory electricity generators. The only competition there can be with their electricity generating monopoly will be by plants privately owned by users. Parliament could not interfere with domestic liberty in this respect; and so, if gas-driven generating sets can give, for light and power, current cheaper than the supply for the two purposes can (taking the average price) be furnished at by the national scheme, the gas industry, with its proposed cheaper fuel gas, will have a still better field for its operations. With the fixed prices at which distributors will purchase current, we shall have brought into stronger relief than ever the big differences of charge for different services; and, without the generating plant under their immediate control, the electricity sales authorities will not be able, we should imagine, with the same freedom as hitherto, to make widely divergent charges as between one form of service and another. If (this "if" should be printed in big capital letters) there is any reduction in cost in the electricity delivered by the generators, the reduction is to be given to the consumers; and the District Boards and Electricity Commissioners are to see that this is done. Here arises another matter. Is the reduction to be spread over all the custom, or only over part? Will the lighting consumers enjoy a part of the reduction, or only the power consumers? To be fair, the lower cost of the current should have an equality in distribution over the whole of the custom.

Ample Scope Provided for Disputes.

There are many points in the Bill which will afford good ground for controversy both during the progress of the Bill, and, if it passes in its present form, for dispute subsequently. In effect, it is proposed that there shall be expropriation of all generating plants by the District Boards; but the terms of transfer to them are not those that are usually recognized. If one man was selling a property to another to-day, some regard would be paid to the cost of constructing such a property on current values. But, in this case, there is to be nothing of the kind. The District Boards are to obtain the generating stations at present existing on what are low terms, taking into consideration to-day's costs, or those that will obtain for some time to come. The annuities which are to be paid to local authorities, it is proposed, shall be only such as will indemnify them against their liabilities for interest and sinking-fund charges on money borrowed for the purpose of providing the generating stations and main transmission lines, with some consideration for any renewals that have been paid for out of revenue. At to-day's values, the stations are worth considerably more. But in the case of companies, a serious injustice is proposed. They are only to be paid the cost of, and incidental to, the construction of the generating station or main transmission line, and the acquisition of the site, less depreciation. The stations represent part of the earning power of the capital, which earning power has been built-up from the combination of elements which constitute the entire undertaking to-day. If the companies are only to be paid the cost, less any depreciation, there will be a considerable amount of capital to be returned to the shareholders which will have to be reinvested in some other direction; and it is questionable whether the holders could reinvest it to produce for them the same return as that with which they are parting. It would be altogether unfair to offer them the existing market value of their stocks. But there is no suggestion of offering them even the pre-war market value. Nothing more is proposed than the cost, less depreciation. This is confiscation with a vengeance; and a proposal that Parliament would not in bygone times have contemplated, much less tolerated, in the case of a local authority proposing to buy up the whole or part of an undertaking of a company supplying gas, electricity, or water. It is clear that those local authorities who have been lax in spending money on the upkeep of their stations, and who have been negligent in the matter of repayments, will now benefit by the transfer to the District Boards, on the terms suggested, of those generating stations that have been kept up to concert pitch. This is not the only opening for discord. There is the price of current. Up to the quantity representing the capacity of the generating plant taken over, the charge by the District Boards to the statutory distributors is to be not more than the cost at which the former owners of the plant could themselves have generated, as governed by the capital charges and the prevailing cost of fuel, labour, &c. Thus there is the prospect that no price advantage will be derived from the transfer of generation—more especially as the new generating plant, *plus* the expense of the new transmission lines, must mean additional outlay; so that, even taking into account the influence of load and diversity factors (which have their effect limitations), the chances are that the cost of additional current will be still greater. If the buyers of the electrical energy are discontented with the charge proposed to them by the District Board, there may be an appeal to the Electricity Commissioners, and not to an independent arbitrator; so that virtually the sellers of the current will have an absolute voice in the matter. Still further grounds for trouble will be found in the right of the District Boards to supply direct to lighting authorities, and railway, canal, or inland navigation companies or authorities. No indication is given as to the terms on which these authorities will be supplied from the plants; and there is a fear that, the national scheme coming under the control of the Ministry of Ways and Communications, such service will have preferential consideration of a kind which will be prejudicial to the current-purchasing distributors for town purposes. Anyway it would seem that they are to be deprived of this special class of custom. In every part of the Bill, there is magnificent scope for controversy, and for some exciting times before the Bill becomes law.

Improperly Advised.

Doubts and fears are spreading in the electricity industry as to the future; and the minds of its men are being vastly disturbed. Is it all going to work out as the champions of concentration would have us believe, or is it a mighty leap in the dark? The platform that was so recently occupied by Sir Dugald Clerk at the Royal Society of Arts has since been tenanted by Mr. J. S. Highfield, with a paper on electricity supply, which, if anything, was a warning to the Government, as was Sir Dugald's, to seriously reconsider its position in this matter of national electricity supply. Has the Government up to the present been properly advised? Is the advice received thoroughly sound? The answer to both questions is "No;" and the volume of the negative answer is daily increasing. Mr. Highfield urged that Electricity Commissioners should be appointed before District Boards or other authorities with powers of purchase and management were set up, and that the Commissioners should examine the whole field, and report to Parliament, before anything was done which would gravely interfere with the electricity industry. We would go farther and say that there is ample evidence now available to show that what is wanted is a properly qualified Commission, consisting not of electrical men only, but of men such as the members of the Board of Fuel Research, and others who have made close study of the question of the utilization of our chief natural resource, to advise the Government as to the way it should go. The preponderating requisite for the community and industry is heat, and not electricity, which is merely a product of heat energy. It is in the first place the correct utilization of fuel for the production of heat that the national interests demand; and there electricity stands arraigned as the most circuitous and inefficient way of obtaining heat. But, as bad fortune would have it, it is in the electrical direction through wrong counsel that the political mind has drifted; and some great effort is wanted in order to stimulate its intelligence to a due appreciation of the fact.

The Maximum Generating Economy.

The whole of the case for the Government taking the course it is doing is that there may be a reduction in the cost of electricity. We have already shown that this is a matter of assumption, and not an established fact. Mr. Highfield knows that folly is guiding the Government. The most favourable figure that he has given in his paper is for a station with 25,000 KW. generators, a maximum load of 100,000 KW., and a load factor of 25 p.ct. Superb conditions! Under them, he gave the total cost of generation at 0·37d. per unit. For transmission at 33,000 volts by means of underground mains the cost per kilowatt per annum per mile he places at 0·13d., and for overhead lines 0·08d. When to these figures transforming, distribution, administrative, and upkeep costs are added, it is quite clear that no improvement is likely to be shown over the selling prices of 1914, which Mr. Highfield puts at 1d. per unit for ordinary factory hours, ½d. for establishments working continuously, and lower prices for special purposes under contract. There must be a point at which gains in economy derivable from concentration of generation must cease. In the recently-issued report of the Hydro-Electric Power Commission of Ontario this point is dealt with; and the "Electrical Review" has drawn it into prominence. It is shown that beyond a certain point the gain in economy due to size of station slackens off materially. From the data examined, the Commissioners have no doubt that, if the smaller stations were operated at the same load factor as that obtaining in the larger stations, the difference in the rates of coal consumption would be very much smaller; and this "emphasizes" the fact that the very large stations do not tend to make very big reductions in rates of coal consumption, as compared with those of more moderate size. Then it is submitted that coal can be better conserved by appreciably increasing the load factors of existing stations of moderate size (around 50,000 KW. capacity), than by building huge stations having only slightly higher load factors than those of the smaller sizes. Further, as to coal consumption, it is concluded that the rate of coal consumption for large stations cannot come below about 6¼ tons per H.P. year—no matter how large a station may be. Our stations this side have not come down to anything like this; and the most sanguine expectations of the Electric Power Committees do not give the hope of anything better—in fact, 1½ lbs. per H.P. hour means much the same thing. The Committees this side have, in fact, built their case for all conditions upon the maximum possible under highly favourable conditions. The Ontario Commission says that, since the equipment now in use is getting near to the maximum possible efficiency, this means that probably, *under no circumstances*, will it be possible to get below (say) 5½ tons per H.P. year. This is only partly the tale, which is not complete without taking into account every item of cost of the electrical business from the generating stations to the electricity consumers' terminals—costs which should be calculated on the new economic conditions, and not on extinct ones.

The Small Consumer.

With increasing costs we should imagine that many electricity undertakings will find it necessary not only to compel the small consumers to pay the minimum charge, but to obtain authority to increase it, in view of the higher costs now obtaining. We know that a large number of small electricity consumers exist; and we know, too, that a large number of these small electrical patrons are quite respectable gas consumers. They are not small electricity consumers and in their circumstances fairly large gas consumers without good cause. A revelation comes from Fulham as to the condition of things. The Electricity Committee reports a large number of very small electricity accounts, amounting in some cases to not more than 2s. or 3s. per quarter, which in all probability barely covers the cost of meter reading and collection. It is advised that there are approximately 1100 accounts amounting to less than 5s. for the summer quarter, and about 400 amounting to less than 10s. for the winter quarter. Under their statutory powers the Council are entitled to charge any consumer a minimum of 13s. 4d. per quarter; and, the Committee are of opinion that, in view of the increased cost of labour and material, the time has now arrived when all accounts should be subject to a minimum charge. This is not surprising.

The Executive Chief of the E.D.A.

In referring on April 29 to the appointment of Mr. J. W. Beauchamp as the Director of the Electrical Development Association, the impression may have been gathered from our remarks that he had made a remarkably rapid flight in the electrical profession—so rapid that his experience could not have been so extensive as it really has been. Our readers will be interested in having some more particulars concerning the "leader" in the commercial opposition. "Electrical Industries" supplies them. For the last seven years or so Mr. Beauchamp has been Engineer and Manager of the Electric Supply Department at West Ham. He was born and educated in London, and was associated as a pupil and in minor staff capacities with several mechanical and electrical engineering firms in the Metropolis. He subsequently spent some years in the Provinces in charge of manufacturing works and in the erection of plant in central stations. In 1900 he joined the staff of the Sheffield Electricity Supply Department. About 1904 he was appointed Deputy-Manager and Chief Assistant Engineer, and occupied this position for about five years, when he became Electrical Engineer to Tunbridge Wells. From Tunbridge Wells he went to West Ham in 1912. Mr. Beauchamp has been associated with local electrical development and publicity work for about fourteen years, and in Sheffield and West Ham has been connected with undertakings always notable for a vigorous and forward policy pursued in connection with large and successful sales and installation organizations. He also had experience in Tunbridge Wells of working-up an electricity supply business with the co-operation of private wiring contractors.

PERSONAL.

Prof. J. W. COBB, of Leeds, has been elected by the Council of the Society of Chemical Industry (under By-Laws 21 and 32), a Vice-President of the Society, to fill the vacancy caused by the death of Mr. Thomas Fairley.

Mr. J. R. H. JACOBS, F.C.I.S., F.S.A.A., has now been made General Manager as well as Secretary of the Southampton Gas Light and Coke Company.

Mr. FREDERICK WILLIAM TAYLOR, at present Engineer, Manager, and Secretary of the Harpenden District Gas Company, has been selected as Engineer and Manager of the Ryde (Isle of Wight) Gaslight Company. There were 107 applicants for the position. Mr. Taylor received his early training under his father at the Shanklin Gas-Works, and was afterwards articled to Messrs. E. Cockey & Sons, Ltd., of Frome, where he received a thoroughly practical training in all departments of gas engineering. At the same time, he studied chemistry under Mr. Norton H. Humphrys at Salisbury. From 1906 to 1909 he was Assistant Engineer and Secretary to his father at Shanklin. During this period the works were entirely reconstructed, and an Act of Parliament was obtained. In 1909 he was appointed at Harpenden, where a considerable amount of reconstruction has been carried out; while the sales of gas have increased from 20 millions in 1909 to nearly 60 millions in 1918—the dividend being increased from 8 to 12½ p.ct. In 1909, he was elected a member of the Institution of Junior Engineers, and holds first-class certificates in both the ordinary and honours grades in "Gas Manufacture" City and Guilds of London Institute. The present make of gas at Ryde is 90 millions per annum.

Lieutenant J. W. BROWN, who has recently been demobilized from the R.A.F., has again been appointed Manager to the Barbados Gas Company, Ltd., and is expecting to sail from Plymouth with his wife to-morrow. Mr. Brown was formerly Assistant Engineer and Manager at Matlock, and was then appointed Manager to the Chapel Whaley and District Gas Company, Ltd. His next appointment was as temporary Manager for the South African Lighting Association; and, on returning to England, he secured the position of Manager to the Barbados Gas Company, which he relinquished in Oct., 1915, to join the army. During the last year that Mr. Brown was at Barbados the average yield per ton of coal worked out at well over 15,000 c.ft. of 14 c.p. gas, without steaming. When it is remembered that this was from horizontal retorts and black labour, it will be seen that Barbados is not behind the Mother Country in results achieved.

At a meeting of the Manchester Gas Committee on Monday of last week, Alderman W. KAY, who is Chairman of the Gas Committee, was presented with an illuminated address, in recognition of his obtaining the high office of Lord Mayor.

Honour was done, at a gathering at Stephenson's Restaurant, Sheffield, to Mr. HANBURY THOMAS, who has lately retired from the General Managership of the Sheffield Gas Company, after 37 years' service. At a smoking concert at which Mr. H. Seagrave (the Chief Accountant) presided, there were present about 200 officials and foremen of the Company, also Mr. R. Halkett (the new Manager), Mr. W. J. Johns (the Engineer), and Mr. William Hanby (the Secretary). Mr. Hanbury Thomas, who was accompanied by Mrs. Thomas, was greeted with much enthusiasm on entering the room. A very excellent musical programme, composed solely of numbers by members of the gas-works' staff, was greatly enjoyed. The Chairman said they had met to do honour to Mr. Thomas, and testify to the happy relations which had always existed between him and the staff. He had always had a most loyal staff. During his tenure of office the business had grown threefold. Mr. Thomas would always have a warm spot in his heart for the interests of the Sheffield Gas Company. They all regretted his retirement, but would agree that he had earned a rest. All present wished that Mr. and Mrs. Thomas might have a long and happy life. Mr. Hanby and others referred in terms of affection to their long association with Mr. Thomas, and wished him happiness in his retirement. Mr. John Dawson then, on behalf of the staff, presented Mr. Hanbury Thomas with a gold wristlet watch. In acknowledgment, Mr. Thomas said that the thought of having to part with so many old friends brought with it a great amount of sorrow. Referring to the growth of the Company's business during the period he had had control, he pointed out that the population of Sheffield had doubled; and the quantity of gas consumed had increased from 1168 million c.ft. in 1882 to 5801 millions in 1917. It was about fifty years since he started with gas. Mr. Thomas Plant presented Mrs. Thomas with a diamond ring; Mr. Joseph Cuthbert, on behalf of the carting contractors, handed Mr. Thomas a travelling clock; and Mr. John Atkinson, also on behalf of the carting contractors, presented Mrs. Thomas with a jewel case, which Mr. and Mrs. Thomas appropriately acknowledged. Mr. R. Halkett, in the course of a short address, said they must have the help of the staff if they were to regain the position they previously held as regarded the price of gas. He associated himself with all the good wishes expressed to Mr. Hanbury Thomas. It may be mentioned that Mr. Thomas went to Sheffield from the South Metropolitan Gas Company in 1882.

In last week's "Personal" column, an intimation appeared of the changes that the Chesterfield Gas and Water Committee have decided to make at their works—among others, to appoint a new Engineer. This was necessitated chiefly through the desire of the Committee to relieve Mr. BUCKLAND, who has been with the undertaking for over forty years, of some of his work and responsibility. It will be remembered that Mr. Buckland last year had serious domestic troubles through the loss of his wife and his youngest son, who was a young man of considerable promise as an analytical chemist. These troubles, together with the strain of management during the years of war, convinced the Committee that the time was opportune to appoint a gas engineer. The new engineer will deal with the many problems that face all gas undertakings at the present time—namely, the increase of wages and materials, which will necessitate probably numerous changes in methods of carbonization, and the dealing with the problems that will arise from the many housing schemes. This will leave Mr. Buckland free to devote his time to works management. The Committee have taken steps to retain Mr. Buckland's services, and have made provision for his future. They appreciate all the arduous and good work that has been done by Mr. Buckland, and believe that the contemplated changes will be entirely beneficial to him.

Mr. W. H. SMEDLEY, the Audit Accountant to the Aldershot Gas, Water, and District Lighting Company, has been appointed Costs Accountant and Assistant Secretary to the Low Temperature Carbonization Company, Ltd.

Congratulations will be extended to Mr. W. J. SMITH upon the fact that, as is recorded in another column, the Central Executive Board have approved a recommendation of the Sub-Committee on Management that he be appointed Secretary (instead of Acting Secretary) of the National Gas Council.

Referring to a paragraph in last week's issue, Mr. Charles Winthrope Somerville writes from Newquay: "After his death, my father was generally referred to in gas circles as 'the late John Somerville,' and I am his youngest son. I am wondering if some error of designation has crept into your announcement of the death of William Lyle Somerville in your issue of the 13th inst., and which, owing to the fact that I have been very ill for nearly three years, may give rise to some misconception."

SPIRAL-GUIDED GASHOLDERS.

On taking up the newest sectional catalogue of Messrs. R. & J. Dempster, Ltd., of Manchester, one has a feeling of astonishment that there should be so much to be said and illustrated in connection with spiral-guided gasholders. But recalling the great progress made during the past quarter-of-a-century by this system of gasholder guiding, one ceases to wonder at the size of the book, which extends to over 120 pages, and is devoted entirely to gasholders and tanks—mostly to the former. Photographs occupy a great deal of the space; and among them are many illustrative of accidents to holders owing to explosion, war, and other causes.

The first four photographs in the book are of particular interest, as they have been selected to show the progress made during the firm's twenty-five years' experience as spiral gasholder specialists. The history of the spirally-guided gasholder is sketched, from the time when (in 1888) Mr. Thomas Newbigging read a paper before the Manchester District Institution of Gas Engineers, describing the invention of Mr. William Gadd (a consulting engineer who was then practising as a patent agent), by which it was proposed to dispense entirely with external guide-framework. In conjunction with Mr. W. F. Mason, Mr. Gadd had taken out a master patent; the holders constructed under the system being described as the Gadd and Mason type. The first of these holders was erected in 1889, at the Northwich Gas-Works; and it is interesting to learn that it is still in active work. In 1890, immediately after this holder had been completed, Messrs. R. & J. Dempster acquired a licence from the patentees to construct the spirally guided type of gasholder; and in 1893 their successors, Messrs. R. & J. Dempster, Ltd., acquired a further licence, and finally purchased the patent outright.

The economy, stability, and other advantages of spiral-guided gasholders are dealt with in a special chapter; and there are, of course, full descriptions of the various well-known "Bearscot" and other specialities applicable to these structures. The work which Messrs. R. & J. Dempster have done in this direction and the practical proof given by them of their faith in the system from the earliest days, deserves to be remembered in connection with the popularity which this type of holder has long enjoyed. It is interesting to note that during the war the Government themselves have erected a large number of spiral-guided holders, which fact should be amply sufficient to ensure the granting of any desired loans for a similar object.

Apart from the features already alluded to, and the section on tanks, the catalogue will further establish its usefulness as a book of reference by reason of the tables and memoranda which are included in it relating to gasholder and tank strains, Mr. F. S. Cripps's ready rules for ascertaining the weight of a gasholder, the weight and sectional area of wrought-iron girders, and much other information useful to those preparing plans and specifications for extensions and alterations to this branch of their undertakings.

TORBAY PAINT COMPANY'S SPECIALITIES.

A gathering of engineers, architects, and others interested in building and similar operations, recently witnessed a practical demonstration of the justness of the claims that are advanced for various specialities about to be put on the market by the Torbay and Dart Paint Company, Ltd., of Nos. 26/28, Billiter Street, E.C. (a Company promoted by the proprietors of "Torbay" paint, who will act as managers for the new concern).

These specialities may be briefly described as follows: (1) "Novoid," a composition in powder form which, when added to the cement and aggregate used in the production of concrete, completely amalgamates with the cement, and causes a chemical action to be set-up when in contact with water, increases the strength of the concrete, and, by filling-up voids, renders the entire mass water, acid, and oil proof, according to the proportion of "Novoid" used. (2) "Roxet," a colourless solution, manufactured on the "Novoid" principle, for coating existing cement, concrete, stucco, &c., which renders the surface impervious to water or the destructive action of the elements. (3) "Rencrete," a liquid solution very similar to "Roxet," but carrying colour in a variety of shades, which renders concrete, cement, plaster, &c., decorative as well as waterproof. (4) "Quelle," a preservative and insect-rot-weatherproof stain, which renders timber fire-resisting and (beyond charring) impervious to flame. Green timber treated with "Quelle" will, it is said, not absorb moisture, shrink, or swell.

The utility and advantages of these articles were demonstrated by Mr. H. Craighill Badder, the Manufacturing Manager to the Company, who is an experienced specialist in building construction and concrete work. Concrete tanks treated with "Novoid" and untreated were submitted to a careful percolation and absorption test extending over about an hour; and it was found that, in the case of the "Novoid" treated ones, the weights remained the same, while the untreated one (weighing before the test 12 lbs. 14¼ oz.) had absorbed over 1 oz. of water, which had percolated some $\frac{3}{16}$ in. into the untreated concrete. There was then undertaken a resistance test; an alkali (hydrate of potassium) and pure hydrochloric acid respectively being poured into "Novoid" treated concrete tanks, and left there for two minutes. The substance of the tank with the alkali was untouched; but, as might have been expected, the acid had slightly penetrated the surface of the other. Mr. Badder, however, explained that the tanks employed had only been made a few days, and had not had sufficient time to properly harden, but that if they had been allowed to set for forty days, the acid could not have penetrated. Two concrete slabs, one "roxetted" and "rencreted," and the other untreated, had hydrochloric acid poured upon them. The surface of the latter was disintegrated, while that of the treated specimen was practically untouched.

Mr. Badder then took samples of "Novoid" in solution, and demonstrated the result, showing a solid product, and explained that this material sets in the concrete, and hardens it and makes it solid. It all condenses; and the longer it is there, the harder it gets. It rather slows the time of setting; but with 10 p.ct. of "Novoid," he said, a 10 p.ct. better result would be obtained than with ordinary concrete after the same interval. In fact, whatever percentage was put in, a proportionally better result in strength would be obtained—that is, with tensile and crushing tests—besides making it weather and water proof. In reply to a question, he declared that if hot coke were turned on to a retort-house concrete floor made with "Novoid," it would not harm or crack the surface. He also stated that "Novoid" permits the adoption of sea-shore gravel as an aggregate for concrete, as it has the effect of neutralizing the salt contained therein, which has hitherto prevented the use of this kind of gravel. "Novoid" does not kill lime; it makes a chemical union with it, and is based on this very fact.

Attention was then turned by Mr. Badder to the qualities of "Quelle." A large number of samples of wood, paper, linen, flannelette, and a sack, treated with this material, were exhibited—all weather, fire, and rot resisting. Matches were freely used, but without success, in endeavours to set fire to these substances—charring only resulting. Pieces of wood were exhibited, treated in different colours; for "Quelle" will carry certain colours—*i.e.*, pitch-pine, oak, mahogany, and walnut. There was also a piece of linen, stretched in a wood frame, both treated with "Quelle." It was pointed out that the linen so prepared, in addition to being fire-resisting, does not absorb moisture. A powerful blow-lamp was requisitioned, and applied close to the linen; and there was no more than charring. Mr. Badder explained that, if the fire was so intense that it charred the fibres, the fabric might give way; but it would have to be a very severe fire to do this. The blow-lamp was then placed inside the piece of sacking; and the sacking appeared to be none the worse for the experience. The same with the flannelette. The coating power of oil paint over a "Quelled" surface is said to be twice that of untreated wood; and the oil paint is protected from catching fire by the "Quelle" underneath.

At the conclusion of the demonstration a number of questions were asked; and these having been satisfactorily answered, one of the experts present said that, speaking as an engineer of many years' standing, he thought "Novoid" in particular was going to overcome a considerable number of engineering difficulties in the waterproofing of concrete—especially as the action of sea water does not affect concrete containing "Novoid," which will enable dock engineers to design their walls thinner. As to the solution which waterproofs and at the same time gives a colour effect ("Rencrete"), he said the advantages in cheap engineering decoration would be enormous—particularly in view of all the cottage property that has to be built.

In thanking Mr. Badder for the open way in which he had answered all questions, he added that the Board of the Torbay and Dart Paint Company had satisfied their audience and convinced the keenest critics that what they claimed for their new products was justified.

Masonic—Evening Star Chapter.

The Installation Convocation was held last Wednesday at the Freemasons Hall, Great Queen Street, when there were three exaltees. Subsequently the Principals were installed and the officers of the Chapter appointed and invested.

Ex. Comp.		William Dommett, P.Z. 1397	M.E.Z.
,,	,,	George Hands	H.
,,	,,	W. Belton, P. Prov. G. Scribe N., P.Z. 262	J.
	,,	Rae P. Normand	Scribe E.
,,	,,	W. A. Surridge, P.G. Std. Br., P.Z. 1201, 1397, 1719	Treasurer.
,,	,,	F. A. West, P.Z. 1602, 1719	D.C.
	,,	A. C. Beal	Scribe N.
	,,	William Edgar	Organist.
,,	,,	W. R. Silk, P. Prov. Assist. G.D.C. Surrey, P.Z. 889	Sojourners.
,,	,,	Arthur Valon	
,,	,,	F. C. Tilley, P.Z. 1348	
	,,	H. W. Packham	Stewards.
	,,	S. Freeman Burrows	
	,,	C. Hulme	

Members of the Yorkshire Junior Gas Association will visit the works of the Campbell Gas-Engine Company, at Kingston, Halifax, next Saturday afternoon.

Mr. Andrew Dougall, M.Inst.C.E., the late Engineer to the Tunbridge Wells Gas Company, who died at the age of 61 years, left estate of the gross value of £11,443.

THE SULZER PROCESS OF TAR DISTILLATION.

A description is given in the "Journal des Usines à Gaz" of the process, and plant therefor, worked out during the war by the Winterthur firm of Sulzer Bros., for the distillation of tar by a process which is continuous in the sense that the tar passes constantly through the apparatus in successive portions, the various constituents of which are removed, until the final residue of pitch is obtained. Much greater economy, and a higher yield of certain products, are claimed for the process.

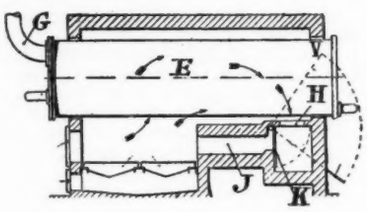


Fig. 1.

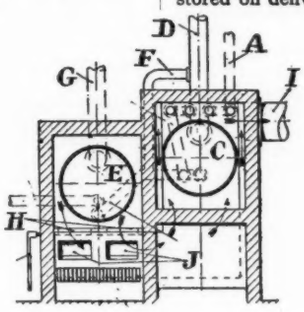


Fig. 2.

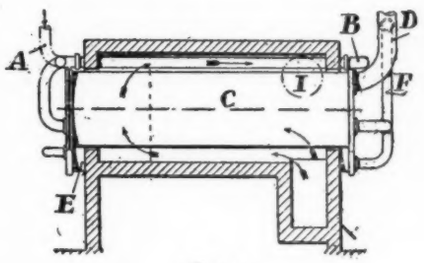


Fig. 3.

The crude tar (undeprived of its water content) is led successively into a series of cylindrical boilers, mounted on horizontal axes, in which the tar is continuously distilled. The boilers are arranged in a single masonry furnace of forced draught—each provided with stirring mechanism by which the boiling of the tar is regulated. As shown in figs. 1, 2, and 3, the tar flows by the pipe A and the pre-heating tubes B into the boiler C, which it fills to about one-third. In this boiler, ammoniacal liquor and light oils are distilled off; the vapours passing to a condenser [not shown] by the pipe D. The tar is led to the boiler E, likewise filled to one-third; any vapour disengaged in its passage joining the pipe D by the junction F. The boiler E stands at a lower level than the boiler C below the furnace, and is thus heated more strongly. In it, the distillation proper of the tar takes place; the vapours of heavy oils traversing the passage G to a condenser [not shown]. The residual pitch is constantly

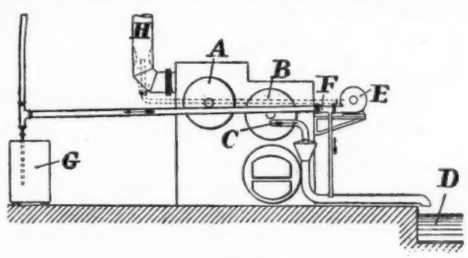


Fig. 4.

discharged by the pipe G, and leaves the boiler at its hottest part. The furnace below provides the heat for the whole system. The hot gases traverse the course shown by the arrows, in a direction opposite to that of the stream of tar—that is, they surround first the boiler C and then pass by the opening H to the boiler C, thence to the pre-heater B, and finally up the shaft I. Under the boiler E are two passages J, which, by the operation of the valve K, allow of regulation of the furnace.

A special device is provided for the recovery of part of the heavy oils retained by the pitch drawing off the vapours evolved by the hot molten pitch as it is in course of leaving the plant. This device is shown in detail in fig. 4, where A and B are the two boilers, and C the tar-outlet pipe opening into a funnel which connects with a pipe leading to the tar pit D. A fan E actuates the air-ejector F, which is connected by a pipe to the pitch outlet. The vapours from the pitch are thus drawn into the pipe F, where they condense. The condensed liquid is collected in the vessel G; while the air is discharged into the atmosphere. Advantageous use may be made of the fan for operating the ejector for the forced draught of the furnaces by a pipe [shown in dotted lines] connected to the fan taken into the shaft H of the furnace.

Figs. 5 and 6 show in elevation and plan a Sulzer plant for the treatment of twenty tons of tar per day. The building is divided by a partition; one part accommodating the furnace and the other the condensers and reservoirs for the distillates. The course of operation is then as follows: From the reservoir in which it is stored on delivery from the gas-works, the crude tar is pumped into the charging tank A, placed aloft in the condenser room. Thence it passes to the furnace D, first through the preheating coil, next to the low-temperature boiler, and then to the high-temperature boiler. Vapours distilled in these boilers are led by pipes towards the condensers G and H. From the first, the condensed liquid proceeds to the separator C. The light oils pass into K; while the ammoniacal liquor, the whole of the condensate in H (the mid and heavy oils), can be brought into one or other of the receptacles M, N, O. It is however possible to separate the two grades of oil. Thus, the pipe P will transmit to the reservoir N the oils which have already condensed in the hot tube F between the boiler and the point where P begins. These are the oils of high-boiling point—the heavy oils. The portion reaching the condenser H (and condensing there) represents the mid-oils which are collected in M. If it is intended to separate the very heavy oils, it is necessary to arrange for the pipe P to branch from the pipe F at a point still nearer to the boiler.

The plant includes the arrangement already described for the recovery of vapours from the pitch. The pipe Q, in which the

1.—RESULTS BY OLD-TYPE TAR DISTILLERY.

—	Light Oils.	Heavy Oils.	Light and Heavy Oils.	Pitch.	Water.	Loss.
	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.
English tars—Coals from—						
Yorkshire	..	41·94	41·94	56·64	0·92	0·50
Northern	..	29·90	29·90	57·50	11·50	1·10
Midland	..	32·82	32·82	64·83	2·35	..
Silvertown	2·66	29·96	32·62	60·00	4·16	3·22
Beckton	3·28	36·43	39·71	56·29	2·00	2·00
Watson Smith	2·20	35·10	37·30	60·50	2·00	..
Belgian tars	1·08	36·62	37·70	58·24	3·06	1·00
German tars	..	39·50	39·50	56·65	..	3·85
	2·92	35·84	38·76	56·54	..	4·70
	2·50	38·00	40·50	52·50	..	7·00
	1·38	38·35	39·73	56·44	2·69	1·14
Austrian tars	4·06	30·20	34·26	60·49	4·27	0·98
	1·24	39·20	40·44	54·56	3·86	1·14

2.—RESULTS BY SULZER DISTILLATION PLANT.

Six-month period	4·01	44·90	48·91	47·52	2·47	1·14
Geneva vertical retorts	0·81*	61·10	61·91	36·22	0·87	1·00

* Sp. gr. 0·875.

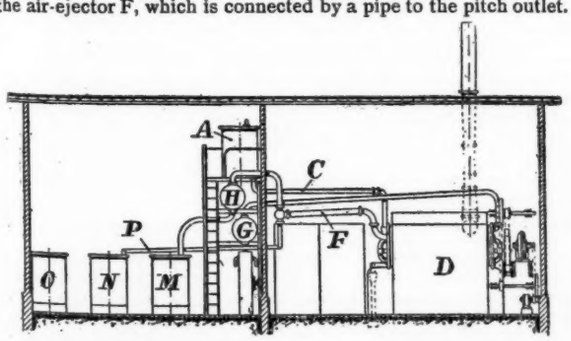


Fig. 5.

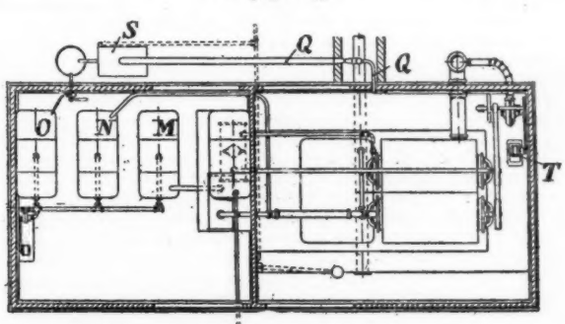


Fig. 6.

ejector operates, connects with the outlet pipe of the pitch; the vapours being drawn to the condenser S. The oil obtained is principally anthracene, and is collected in A.

Apart from the heating of the furnace the power for the installation is the small electric motor T, which operates the stirrers in the boilers and the fan for the two ejectors.

In comparison with the old type of tar-distilling plant, the installation requires less than two-thirds the superficial area; and the cost of the mechanical parts is in about the same ratio. For a Sulzer plant of a capacity of twenty tons per day four men in two shifts of two are amply sufficient. Apart from the furnace, their work consists only in regulating the supply of crude tar and condenser water, the flow of the pitch, and the temperature of the boilers.

The preceding table contains figures relating to installations of the old type and to those on the Sulzer system. It will be seen that the production of heavy oils is practically the same throughout. On the other hand—owing to differences of view as to what constitute "light oils"—the figures for these latter exhibit great variations. It is for this reason that the figures in the third column (the combined yield of light and heavy oils), are a better criterion of the value of an installation. This yield ranges from 29·9 to 41·94 p.ct. The first line of figures relating to the Sulzer plant contains the average results of a long period of working, in which 1,041,160 kilos. of tar were treated. This tar came from various Swiss gas-works:

Basle	609,270 kilos.
Geneva	197,060 ,,
Winterthur	130,562 ,,
Lausanne	57,873 ,,
Berne	46,395 ,,
Total	1,041,160 kilos.

From this amount were obtained:

Heavy oils	468,097 kilos.
Light oils	41,753 ,,
Ammoniacal liquor	25,713 ,,
Pitch	495,171 ,,

The total fuel consumption was 61,170 kilos. of coke, or 5·88 kilos. per 100 kilos. of tar; and the consumption of condenser water was 2,992,120 cb.m., or 0·2835 cb.m. per 100 kilos. of tar.

It will be seen that the characteristic of the Sulzer results is: More oils and less pitch. This superiority is more particularly evident in the second line of figures relating to tar from vertical retorts at the Geneva Gas-Works. The distillation of this tar yielded 61·91 p.ct. of heavy and light oils with only 36·22 p.ct. of pitch. It is thought that these latter are the best results ever obtained in the distillation of tar.

NEED FOR UNIFORM GAS-SUPPLY PRESSURES.

Not the least important of the numerous problems that are to-day occupying the attention of gas engineers is the need for a nearer approach to uniform supply pressures in all parts of the district; and, for the most part, the inefficiency of existing distribution plant in this respect. This may be partly due to the impracticability of carrying out much-needed extensions during the last five years; but the real cause dates farther back. For many years the use of stoves and industrial appliances has steadily increased, and the supply districts have as steadily expanded. In many country towns, the original system of distribution from one source only (at the gas-works) is still in use. It was laid out for a comparatively small district, and for pressures of 12-10ths to 15-10ths at the consumers' meters. But the district formerly enclosed by a mile radius from the source of supply has now expanded three or four fold. The extremities may be three miles or more distant; and the pressures at the meters must be at least 20-10ths, and preferably 30-10ths. This is bad enough if the works are situated at or near the centre of the district. But, as a general rule, distribution difficulties are intensified by the source of supply being located at one end, or even outside, the area, or by the shifting of important centres of consumption. In the large towns, there may be more than one works, or several district supply sources; but in districts not exceeding 20,000 population, there is usually a single unit.

Considering the subject in a paper presented at a recent convention of the Illinois Gas Association, Mr. C. C. Boardman said that piecemeal extensions to deal with deficiencies or troubles as they arose did not meet the case. Uniform pressure could not be ensured from one source, for a district comprising the usual quota of stoves and industrial appliances, over more than a very limited area; and compliances with legal requirements did not meet the case. The Illinois State Commission defined passable low pressure as anything between 2 in. and 8 in. at the meter outlet, with 100 p.ct. maximum variation in the twenty-four hours. Some heating apparatus might give satisfactory results within these limits; but lighting appliances certainly would not.

By way of illustration, a gasholder centrally situated to supply a district one mile in diameter was considered, with 600,000 c.ft. daily output and 80,000 c.ft. per hour peak load; and a diagram showing the initial pressures necessary to ensure a minimum of 30-10ths at the extremities was exhibited. If four 8-in. trunk mains left the station radially, any one might be considered to pass 20,000 c.ft. per hour. In the attached table (taken from the diagram) A showed the pressure conditions at intervals 100 yards from the source; B, the same if carburetted water gas was substituted for coal gas; C and D, increase of demand to the extent of 50 and 100 p.ct. respectively. From these figures it is evident that increase of initial pressure to meet a larger demand brought larger areas under excess of pressure.

	A	B	C	D
Output per hour, c.ft.	20,000	20,000	30,000	40,000
Initial pressures, tenths	48	56	70	105
Pressure 300 ft. distant tenths	44	51	63	91
,, 600 ,, ,,	41	47	56	78
,, 900 ,, ,,	38	43	49	67
,, 1200 ,, ,,	36	40	43	57
,, 1500 ,, ,,	34	37	38	47
,, 1800 ,, ,,	32	35	35	40
,, 2100 ,, ,,	31	33	33	36
,, 2400 ,, ,,	31	32	32	34
,, 2700 ,, ,,	30	31	31	32
,, 3000 ,, ,,	30	30	30	30

Increasing the initial sources of supply appeared the only way to secure anything like uniform pressure. The entire renewal of the mains was rarely practicable; but centres could be multiplied by means of district holders, high-pressure feeding or trunk mains, and district pressure regulators connected to the low-pressure mains at points suited to the local consumption. A source supplying a 1200 ft. radius, under conditions A, would not present a variation at any one part exceeding 8-10ths; but smaller centres would be necessary in circumstances such as C and D.

The author appears to have selected small size trunk pipes, possibly for the purpose of showing up his arguments. Distribution arrangements may have fallen far in arrear of requirements, but rarely to such an extent as to involve the supply of 20,000 c.ft. per hour through a pipe 8 in. in diameter. In such circumstances, the minute to minute fluctuation would lead to trouble; for the peak load does not follow a regular hour to hour variation, but is continually on the move, especially where a considerable number of large industrial burners are in use. Applying the above methods either to smaller rates of consumption or to larger pipes, the differences between initial and final pressures are reduced, and the size of the distribution area may be increased in proportion.

HEAVY OIL FOR BENZOL EXTRACTION.

The publication of the following brief note by M. St. Claire Deville, in the "Journal des Usines à Gaz," has been authorized by M. Rouland, of the Paris Gas Company. In specifying the best means for the preparation, from so-called crude anthracene oil, of oil for benzol extraction, M. Deville is of the opinion that the oil should be identical with that which was the subject of experiment by him in 1904 and 1905 for the removal of naphthalene from gas in "Standard" washers. For its preparation anthracene oil is distilled. The first vapours appear at 200° C.; from 200° to 270° C. a yellow product passes over, and solidifies in the vessel in which it is collected, and is found to consist chiefly of naphthalene; above 270°, the distillate is again liquid—the naphthalene having been completely distilled. Distillation is then stopped, and the residue cooled as strongly as possible. Anthracene is then deposited in considerable quantity; the liquid portion of the mixture being the oil to be used in naphthalene washers or benzol extractors. Anthracene oil treated in this way on the experimental scale yielded: Crude solid naphthalene, 31·0 p.ct.; solid anthracene, 15·0 p·ct.; and oil for washers, 54·9 p.ct. The oil thus prepared is highly fluid, and no ordinary cooling causes it to thicken. On the other hand, after use in the washers it yields only the products, benzol and naphthalene, extracted from the gas when distilled at a temperature considerably below 270° C.

At the time M. Deville's experiments were made, considerable prominence was given in Germany to a washing oil, called "Bueb," from the name of the well-known Dessau engineer, and sold at a high price. This oil, as the experimental works of the Paris Gas Company found from a sample, resembles in physical appearance the oil prepared as above described. When distilled, it begins to boil at 80° C. From 80° to 200° C., 4 p.ct. of benzol passes over. The thermometer then rises sharply to 260° C.; and from 260° to 270° 1·5 p.ct. of a yellow liquid which does not solidify on cooling is collected. The Bueb oil is, in fact, identical with the oil already described, except that 4 p.ct. of benzol has been added to it. The addition is made for the purpose of preventing the absorption of benzol from the gas when first using it in naphthalene washers.

M. Deville briefly specifies the properties of a good oil for benzol extraction as one completely freed from benzol and naphthalene by distillation and from anthracene by cooling. The cooling, in summer, at any rate, may usefully be done by means of artificial refrigeration.

A Norwegian Process.—The French lay Press has recently drawn attention to an invention of the Engineer of the Bergen Gas-Works, according to which it is said that a yield of 500 cb.m. of gas per tonne (18,000 c.ft. per ton) of coal distilled is obtained. The Société Technique du Gaz are in communication with correspondents in Norway and Sweden, for the purpose of obtaining accurate particulars of the process.

GAS EQUIPMENT IN RELATION TO NATIONAL HOUSING SCHEMES.

By R. J. ROGERS, of Birmingham.

[A Communication to the Derby Conference of the British Commercial Gas Association, May 9.]

At the end of the great war the nation is faced with many varied and difficult social and industrial problems. By no means the least of the domestic problems is that concerned with the provision of suitable housing accommodation. It is a subject which has for some time past occupied the attention of Parliament, local authorities, and those concerned with the design and equipment of houses. Everyone is agreed as to the urgent need of more houses, and of the necessity of designing and equipping them with suitable appliances in order to provide the maximum amount of comfort with a minimum of labour for the housewife. We are reminded daily of this domestic problem by the various reports and articles in the Press. So universal is the subject, that it is receiving the attention of King and cottager. It is of special interest to those of us who are attending this conference. There are present here to-day not only the representatives of the various gas undertakings in the Midlands, but architects, builders, and those who are responsible for the design and construction of the houses of the future.

In opening this discussion on "Gas Equipment in Relation to the National Housing Scheme," I think we should do well to consider the subject from the point of view of the gas undertakings who have to provide the service of gas, and also of those who are more directly concerned with the design of the houses. So far as the gas industry is concerned, we feel confident that we can render service vital to the interest of the nation and the individual, in providing the means whereby many of the domestic problems may be solved. The housewife demands, and rightly so, that labour-saving devices shall be available in the new houses. If we analyze the work in the average household as at present equipped, we find that a large proportion of the drudgery and dirt is due to the operations of heating, cooking, and providing hot water. The adoption of gas for these purposes will ensure the labour in the home being reduced to a minimum, and result in a great improvement in domestic hygienic conditions.

THE GAS INDUSTRY'S OPPORTUNITY.

The industry has now a golden opportunity, which should be taken advantage of by all gas undertakings, in proving to the housing authorities and to the general public, the indisputable advantage of gas for heating, cooking, and the provision of hot water, and the lighting of new houses. It must be remembered that our suggestions and the recommendations in this regard are not of a theoretical character—as are some of the schemes of electricity which are constantly appearing in the Press—but are based on practice which has already been successfully carried out in many thousands of houses of all types, in all parts of the country. In many districts garden villages and housing schemes of various magnitudes have adopted gas apparatus for most of the operations of warming and cooking in the houses; and as a result of this practical experience, we are able and anxious to advise local authorities and architects, and all those interested in the subject, as to the manner in which the heating, cooking, hot water, and lighting supplies should be planned. The gas industry is at the service of the nation in this matter; and it is incumbent on all gas managers to see that they get into touch with the officials concerned with the housing schemes in their particular district.

The proper time for the consideration of the installation of gas appliances is when the houses are being planned. Much time and trouble will be avoided it this is carried out. It is obvious that no "cut and dried" scheme of gas apparatus can be laid down. Much depends on the type of house under consideration, and the kind of tenant who will be living there. It has been proved, however, during the past few years, that even in the very smallest type of artizan dwellings solid fuel may almost entirely be supplanted by gas. The booklet, "Gas Installations for Housing Schemes," published by the British Commercial Gas Association, gives full particulars and details of housing schemes in which gas has been adopted as the chief fuel and lighting agent. In Birmingham we had, prior to the war, several hundred "all-gas" houses, but these were for the most part the homes of middle-class people.

During the war, however, we have had an interesting experience in providing gas for an estate of an essentially working-class character. One of the largest industrial enterprises in the Midlands, the Austin Motor Company, Ltd., made such prodigious growth during the war that it became necessary to provide more accommodation for their workers. The Longbridge works, while comparatively isolated from the amenities of city life, are situated amid delightful surroundings in the very heart of England, where the natural characteristics of soil and scenery lend themselves readily to the growth of a garden city. The Directors formulated a scheme with this ultimate ideal, and acquired an estate comprising 120 acres. Forty acres have already been developed, and 250 houses built. Owing to the urgency of the housing problem, and to the difficulty of obtaining building material, it was decided to erect to a standard plan 200 wooden bungalows as a temporary measure, and 50 brick houses. Eleven months from driving the first peg, roads, sewers, services, and the whole of the bungalows and houses were completed and in occupation, notwithstanding the difficulties of a severe winter, transport, labour and its housing, feeding, and the securing of materials. I am indebted to Mr. J. W. Wilson, the architect of the Austin Motor Company, for some of the following particulars.

Bungalows.—In the erection of the wooden bungalows, it has been necessary to keep uniform frontage lines; but ultimately the reserved spaces behind the gardens will form part of the replacement area for permanent structures in groups and quadrangles. The bungalows were imported from the U.S.A. in parts ready cut but unassembled; the material being of sound quality. All external timber, except joinery, is of red cedar, even to the roof "shingles." There is little doubt that these detached healthy little homes have found much favour with the workers, primarily because the installation of gas apparatus and coke-boilers has reduced the household labour to a minimum. In the bungalows the accommodation consists of a living room, 20 ft. by 10 ft., entered from a roomy hall or enclosed porch 6 ft. by 10 ft. A kitchen 10 ft. square, containing fixed dresser with cupboard, flat table, gas-cooker, gas-washing boiler, and sink with drainer; three bedrooms, each 10 ft. square; bath room with white porcelain enamelled bath; a good larder and outer porch, from which is reached the heating chamber, containing a slow-combustion sectional boiler heating the whole of the premises by means of low-pressure hot water through radiators, in addition to supplying domestic hot water. This heating system is coke and refuse consuming, economical in use, and a great labour saver. Every room is provided with an adjustable inlet ventilator under the radiator, and an outlet on the ceiling level. The smaller items provided in the tenants' interest are gas-fittings and globes, blinds, curtain rods, &c. All floors and joinery is stained.

Brick Houses.—Fifty brick houses, in pairs, have been erected to a standard plan; but considerable elevational variation has been given by the use of differing finishing material. These houses have been grouped around the cross-roads, breaking the line of the bungalows. They are also designed to economize household labour; and the same principle of heating is adopted as with the bungalows, except in that gas-fires of the most hygienic type are fitted in the two sitting rooms. For accommodation, there is a roomy and well-lighted hall with recess for perambulator or cycle, and an arched lobby with fixed hat and coat hooks; parlour, 11 ft. 6 in. by 11 ft.; living room, 11 ft. by 15 ft., with dresser fitment and cupboard; working kitchen with gas-cooker, gas-washing boiler, sink, drainer, and dwarf cupboard; also amply ventilated larder and heating chamber and fuel store. A well-lighted staircase reaches the small landing, from which are entered four bedrooms and bath room, hygienically equipped. The largest bedroom posseses additional loops in the heating radiator to admit of increasing the temperature in the event of illness, while a commodious cupboard leads from the smallest room. The houses are simply decorated by self-colour Durescoed walls and brown-stained woodwork. The hall and kitchen are floored with black and white tiles; and gas-fittings and curtain rods are supplied.

It will be noticed that, in the bungalow type of dwelling, the warming of the living room, kitchen, and bedrooms are dependent on radiators supplied with hot water from the coke-boiler. It is, however, interesting to know that many of the tenants have, after experience with them, expressed a wish to have some form of open fire—either coal or gas—in the living room. There can be little doubt that the average person in this country does not approve of the radiator system for warming the living room; and it is well to take this into account in the planning of house equipment.

In the brick built houses, the iron coal grate frames have been omitted from the parlour and living room, and gas-fires fitted in front of a suitably tiled or brick back—the hearth tiles being raised a few inches above the floor level. No flat-flame burners are fitted on this estate.

The following particulars of the cost of gas and coke have been compiled from careful records kept over a period of 17 months, and, it must be noted, were for the period prior to the operation of the Household Fuel and Lighting Order, 1918. With the practice of economy the average consumptions are now in all probability very much less.

Bungalows.—The average consumption of coke per bungalow per annum is rather less than 4½ tons (equivalent in fuel value to 3 tons of coal on the basis adopted in the Household Fuel and Lighting Order, 1918), or 1¾ cwt. per week.

The average consumption of gas for lighting, cooking, and gas-wash boiler is 44,500 c.ft. per annum. The average cost of coke and gas per bungalow would be: Coke 3s. 11d., gas 2s. 5d.—total, 6s. 4d. per week, taking summer with winter, and based on current prices in Birmingham, with coke at 2s. 3d. per cwt. and gas at 3s. per 1000 c.ft., less 5 p.ct.

Brick Built Houses.—The average consumption of coke per house per annum is rather less than 1½ tons (equivalent in fuel value to 1 ton of coal), or a little over ¼ cwt. per week. During the winter months, the majority of this fuel is consumed. The average consumption of gas for gas-fires, lighting, cooking, and gas-wash boiler is 118,500 c.ft. The average cost of coke and gas per house would be: Coke 1s. 3½d., gas 6s. 6d.—total, 7s. 9½d. per week, taking summer with winter, and based on current prices in Birmingham, with coke at 2s. 3d. per cwt. and gas at 3s. per 1000 c.ft., less 5 p.ct.

It must also be remembered that both the bungalows and the brick houses were housing families up to their full capacity, as preference was given by the Austin Company to tenants who undertook to take in lodgers during the great shortage of housing accommodation. In many houses, certain of the residents worked night shifts, and others day shifts. This resulted in more meals having to be cooked. The consumption of gas for cooking was therefore much above the average for that sized house. A 1 in. gas-service is run to each house, and a 10-light ordinary meter is fitted.

As evidence of the reliability of the gas equipment on this estate, I may mention that, during the two years that the houses have been occupied, we have not received a single complaint of "no light" or "bad supply." On visiting several of the houses a few weeks ago, I noticed that in a few instances the inverted incandescent burners provided by the Estate Company were showing signs of not being properly adjusted. In order to prevent complaints, and to assist the consumers in the correct adjustment of the burners, we immediately sent to each house a booklet, published by the Gas Department, on "How to Clean and Adjust the Incandescent Gas-Burner." It is by such means that we endeavour to maintain the permanent satisfaction of the consumer in the commodity we have to sell. We have kept a careful record of complaints received from the 250 houses on the estate; and they amount to about twenty during the two years—fourteen being due to minor escapes on the rail taps of the cookers, and six requiring new deflectors or utensils. I attribute the freedom from complaints to be due to the installation of pipes of adequate size, and properly fitted.

Regulations Required to Govern Pipe-Fitting in Houses.

Too much emphasis cannot be laid on the importance of installing pipes of sufficient capacity to supply the apparatus. Unfortunately in this country there are no bye-laws to compel builders and others to fit gas-supply pipes to an approved specification. It is therefore necessary for gas undertakings to employ an efficient staff to advise architects and builders on these matters. In America and Germany, many cities have rules and regulations governing the size of pipes, method of fixing, &c.; and only those gasfitters and plumbers who are authorized by the municipality are allowed to fix pipes in buildings. These must then be run to a suitable specification.

Now that the housing schemes in this country are to be largely controlled by the local authorities, and assisted by grants from the National Exchequer, I would suggest that the time is opportune for the consideration of this question by the gas industry to inquire as to whether some regulations should not be adopted to ensure, in all houses erected under the National Housing Schemes, that they be fitted not only with pipes, but with efficient apparatus of approved type that will give the best possible service and permanent satisfaction to tenants. Public utility undertakings, such as water and electricity, have their bye-laws and regulations, which must be recognized by those responsible for fitting such services in houses; and I do not see why the gas undertakings, who will be called upon to maintain the apparatus, should not have a recognized voice in deciding certain essential matters in connection with the gas equipment adopted.

The Government are anxious to put a stop to what is termed "jerry building." We, as an industry, should not only be anxious, but insistent, in seeing that, as far as lies in our power, a stop is put to "jerry gas-fitting." We have all had experience of this inefficient work. It results in poor service being rendered to the householder, and in very heavy and unnecessary charges being incurred by gas authorities, to say nothing of the loss of gas consumption. The house pipes are usually the property of the landlord, and if not laid properly in the first instance lead to subsequent trouble and expense in clearing stoppages, &c. It is the practice of many gas companies to make a charge for running a gas service to the house and for fixing the meter. In such cases it may be advisable to carry out the work free of charge, conditionally that pipes and apparatus of an approved type are installed in the new houses. I may mention that in Birmingham for many years we have made it a condition that slot meters and fittings are only provided by the Gas Department when the houses are fitted to our specification. We attribute the very satisfactory consumption per slot consumer (probably the highest in the country) to this fact. I feel sure that it is a policy worthy of further extension if it can be arranged.

Arrangement of New Houses.

I will not attempt this afternoon to enter into the question as to how many rooms should be built in the new houses, or whether a separate kitchen and scullery should be included in the building, or whether these two apartments should be combined. All these points to my mind must be considered by the architect or local authorities in the light of local requirements. Architects, builders, and local authorities may rest assured that whatever design of house is constructed, the gas industry can offer to them suitable appliances for use for all purposes of warming, cooking, and providing hot water.

In certain types of houses it may be desirable to adhere to at least one coal-grate in the house. Sometimes it may be desired to instal in the living-room the coal-grate, at the back of which would be fitted a boiler for providing hot water. In other houses it may be decided to instal the coal-grate in the kitchen. There are now on the market several combined gas and coal ranges for use in the kitchen; and these should not be lost sight of for adoption in certain types of houses. There is a large field for the extension of the use of gas for heating water; and there are on the market a number of appliances designed for this purpose.

In order to obtain the greatest economy, it is necessary, however, that the storage tank shall not be of so large a capacity as those at present fitted in the average house. The capacity of the tank, of course, varies with the size of the house. In many designs of houses of the artisan and middle-class type, it is seldom that more than 15 gallons of really hot water are required to be stored; and this quantity may then only be required once or twice per week. The type of gas apparatus therefore which will give the greatest economy in gas comsumption for permanent use will be the one which is connected to the smaller storage tank. The regulations of some Water Departments are still somewhat antiquated. They insist on the hot-water storage tank being of a much higher capacity than is now considered necessary when the gas-heated boiler is installed.

The Water Committee of Birmingham have now agreed to the installation of a hot-water storage tank of a minimum capacity of 20 gallons, but will not allow of any valve, cut-off, or other arrangement being fitted which will prevent the free and automatic return of a minimum of 20 gallons to the bottom of the boiler or apparatus to which the heating agency of whatever kind is applied. This will preclude us from fitting gas boilers with a valve to reduce the hot water in circulation below 20 gallons, and will thus prevent the maximum economy in heating being obtained. I should be interested to hear whether such restrictions on the use of this type of storage tank are imposed by other water authorities in the Midlands. I fail to see why the Water Department should object to these appliances when gas only is used as the heating agent.

Apparatus of Approved Type Only to be Fitted.

As many gas consumers know to their cost, certain gas appliances which are advertised and recommended for fixing are not at all suitable or efficient in operation. Shopkeepers and others who sell such appliances are, as a rule, only concerned with the profit they obtain on the sale of the article, and care very little if the apparatus will give good service or not to the user. I think, however, a good deal more might be done by gas undertakings by co-operating with ironmongers, private gas-fitters, and shopkeepers, and by arranging some system whereby the gas undertakings should hold certain stocks of reliable apparatus and allow special discount to the shopkeepers on the sale of such articles. It is to our interest; and I am sure we do desire to co-operate on friendly terms with all retailers of gas consuming appliances. But we must see that they sell apparatus which will render good service to the user. It is necessary for the ironmonger or other trader to obtain the goodwill and satisfaction of the person to whom he sells an article: and if he realizes this I feel sure he would be willing to co-operate with the gas undertaking in seeing that only reliable goods are sold to consume gas in the district. In the new housing schemes only those appliances which can be certified as efficient for the particular purpose for which they will be required in the home should be allowed to be fitted. How often in the past has the cheaper apparatus which has been adopted for hiring or sale by a gas undertaking proved costly in maintenance? We must avoid this in our future business. The apparatus that can be purchased at the lowest cost, or the one that gives the highest thermal efficiency, is not necessarily the one that we should always recommend for installation in new houses. The thermal efficiency of the apparatus, though not the chief factor, is an important one, as economy in operation will tend to its constant use and produce greater gas consumption. All our efforts must be concentrated on ensuring that the apparatus installed shall give satisfaction, as I think we are all agreed that the best advertiser of our goods is the satisfied consumer.

Cost of Apparatus.

I do not wish to take up time to-day in discussing the high price of gas apparatus, or the labour in fitting it. It is a problem which most gas undertakings have now under serious consideration, especially with regard to the supply and fixing of apparatus on hire terms. It would appear that, in common with the other necessaries of life, the price of gas and gas appliances is not likely to show a downward tendency for some little time to come While exercising every true economy in the production and sale of gas, we must accustom ourselves and our consumers to present ruling prices. Before the war we induced builders in Birmingham (by offering them a small sum per position) to run gas supplies for cookers and gas-fires in parlours and bedrooms, and also to leave tees in the flow-and-return water-pipes ready for connecting to gas-heated circulators. This offer was conditional on a tiled back being fitted in the fire-grate instead of a coal-grate. The tenants then hired gas apparatus from us. This scheme worked out quite satisfactorily.

Payment for Gas Apparatus for the New Houses.

So far as the provision of gas equipment is concerned for the new housing schemes, this should be considered, in my opinion, quite independently of what gas undertakings have done in the past, or what they may be prepared to do in the future in relation to fixing auxiliary appliances in existing houses. In building the new houses, the owners should themselves provide the gas equipment necessary for the heating, cooking, and other operations. It may

be considered politic in certain circumstances for the gas undertaking to lend financial assistance in the cost of fitting-up the houses with pipes, or by laying the services and fixing the meters free. Whether or not the gas industry as a body are able to arrange any general scheme relating to the specification of piping and apparatus to be fixed in new houses, it is at the moment highly desirable that gas managers should make the best arrangements possible with their local Housing Committees.

At a recent conference of the "B. C. G. A.," I noticed that several speakers raised the point as to how gas undertakings would be able to provide the capital for the purchase of gas appliances, and asked how the gas authorities would be recompensed for the outlay. I fail to see the equity of gas undertakings bearing the capital expenditure for the equipment of gas appliances in the houses. As I have already pointed out, the local authorities are to receive certain financial assistance from the Government to aid them in constructing the houses. Surely this assistance should extend to the provision of those highly necessary services relating to the lighting and warming of the building, the cooking of the food, and the provision of ample supplies of hot water. The water department and companies do not provide at their expense baths, cisterns, or sinks, without which the commodity they have on sale would be almost useless in the home. The coal merchant does not supply the ranges and grates which consume the coal he sells. Why then, should gas undertakings be expected to provide gas consuming appliances free of charge? True, we have not a monopoly in the supply of heat, and have various kinds of competition to meet. But I feel that the case we have to present for the use of gas from the national and social standpoint is a very strong one indeed.

THE MEN WHO WILL FIX AND MAINTAIN THE GAS APPLIANCES.

An important factor in the success of gas heating in these new schemes will be the manner in which the apparatus is fitted and maintained. I am afraid that many gas undertakings have not yet fully realized the vital part which the gas-fitter plays in securing permanent gas consumption. We plan our advertisements to appeal to the consumer. We employ our various staffs to obtain the order for the apparatus. In the end, all our efforts and expense may be lost (or seriously discounted) if the apparatus is not correctly fitted and adjusted to the full satisfaction of the consumer. In entering this new era of gas usage in the house, we shall do well to pay the utmost regard to this matter.

For those present who are representatives of local authorities, and for others who are not connected with the gas industry, it may be well to state briefly the reason why the gas industry considers that most favourable consideration should be given to the use of gas in the new schemes, and why we consider that gas should be the fuel of the future. In the first place, we claim that, in the national interests of coal conservation, the utilization of gas will result in the utmost value being obtained from coal. Sir Dugald Clerk, Prof. Arthur Smithells. and Prof. John W. Cobb, in their report on "Coal Gas and Electric Supply Industries of the United Kingdom," summarize their investigations as follows:

(1).—If the whole of the heat expended on the carbonization of coal be debited to the coal gas which is produced, then, of every 100 units of heat so expended at the gas-works, 45 are conveyed to the consumer in the supply of gas.

(2).—At the present electricity stations of the United Kingdom, of every 100 heat units expended by the combustion of coal for the generation of electricity, 7·6 are available for the consumer.

(3).—In the best existing undertakings for gas and electricity, the figures are altered as follows: For gas, 53; for electricity, 12.

(4).—In the proposed super-station, the conjectural figure for electricity is approximately 18. With improved practice of coal carbonization, the corresponding conjectural figure for gas is about 75.

I trust some steps will be taken to bring these figures to the notice of every man and woman in the country. The figures show beyond doubt that the fuel resources of the nation will be best conserved by the adoption of gas for heating purposes.

We further claim that the use of gas for general domestic purposes will largely abolish the smoke nuisance. These we consider are national reasons why gas should be adopted. But perhaps the greatest claim for the use of gas in the home is what we may term local or domestic advantages. The following brief points are of particular interest to the architect and builder: The adoption of gas-consuming appliances means: No smoke chimney stacks, no smoke flues, no chimney breasts, fewer coal grates, reduced coal storage, reduction in the cost of building, increased floor space. To the householder, the use of gas appliances means less labour in the home, less dirt, less expense, less worry, greater comfort, more space.

In conclusion, if there are any persons in, or outside, the gas industry who hold pessimistic ideas as to our future prospects in the heating field, they should find "food for thought" in reading one clause in the report issued by the Fuel Research Board in their report on "Gas Standards." Clause 48 states:

> "For lighting and for power production the electric supply of the future may seriously contest the field with the producers of gas; but *for the supply of heat, gaseous fuel ought to remain supreme if its production and use are developed on sound lines.*"

Such testimony from fuel experts of such eminence should certainly encourage all of us to even greater energy in prosecuting our efforts to see that gas is given its due place in the equipment of National Housing Schemes.

WAR TIME EXTRACTION OF BYE-PRODUCTS IN FRANCE.

Some notes by M. Lindet, President of the French "Society for the Encouragement of National Industry," are quoted in the current issue of the "Journal des Usines à Gaz" from a paper in the course of which M. Lindet has reviewed generally the efforts realized by French industry during the war. A portion of the paper gives a general description of the measures taken in the extraction of bye-products jointly by the Paris Gas Company and the Société d'Éclairage.

Previously to the war very little had been done in France in the way of recovering phenols from coal tar. Phenol for pharmaceutical and explosive purposes had been obtained from England and Germany. With the sudden demand for enormous quantities of phenol, it was arranged with the Explosive Service that extraction of crude phenol from tar should be done by the two Paris gas undertakings, not only for their own products, but for those of the suburban gas-works and of provincial undertakings. The Gennevilliers works was assigned the task of refining the crude phenol and of separating the cresols. The naphthalene oils were first distilled between 180° and 250° C., and cooled for the separation of naphthalene. For the extraction of crude phenol, La Villette works received the oils, after removal of naphthalene, from all the works of the Paris Gas Company and even from that of Gennevilliers. The oils were treated with soda lye of 15° Beaumé; practically equal volumes of oil and lye being used. The lye was delivered under a pressure of from 2 to 3 kilos per square cm. through a rose some 16 in. in diameter; the spray, being heavier than the oil and thus passing through it. The density of the alkaline solution, owing to the low density of the phenol dissolved, is reduced from 15° to 13° Beaumé. It is evaporated to a density of from 19° to 20° Beaumé, and treated with sulphuric acid of 52° to 53° Beaumé. The saturated liquid has a density such that the phenol rises as a surface layer.

The plant organized in December, 1914, allowed of an annual output of some 2000 tonnes of crude phenol, representing from 8000 to 10,000 tonnes of oils and about ten times this quantity of tar. The crude phenol, as thus prepared at La Villette works, contains on the average 15 p.ct. of water, 20 p.ct. of phenol, 12 p.ct. of ortho-cresol, 37 p.ct. of a mixture of meta- and para-cresol, and 16 p.ct. of residue. The quantity of phenol is equivalent to 4 p.ct. of the oils treated; the yield amounting to not more than 3 p.ct., or 3 kilos per tonne of tar. In the separation of phenol from the cresols the comparatively small differences in the boiling points presented difficulties in fractional distillation. After having distilled the crude phenol and collected a mixture of impure phenols, phenol itself was separated from the cresols by suitable addition of water; the cresols remaining in the dissolved state in the liquid, while the phenol formed a crystalline hydrate containing half a mollecule of water. The phenol was then re-distilled under a reduced pressure of about 60 mm., allowing of the separation of small quantities of cresols. The latter were returned to the mother liquors from the crystallization of phenol.

A fresh distillation of the cresols, also under reduced pressure, gave, first, ortho-cresol and then the mixture of meta- and para-cresol. Control of the product obtained by this rectification was done by observations of the temperature of distillation or of density or of melting point. The Explosives Service manufactured ortho-dinitro-cresol from ortho-cresol and cresylite from the mixture of meta- and para-cresol. M. Lindet expresses the view that the manufacture of phenol from tar should be always more economical than a synthetic process, and that therefore the tars from French gas-works and coke-ovens will continue to be used for the recovery of phenol. He views the cresols as more uncertain until it is seen what use is to be made of them by the dye industry; but the Paris Gas Company intend to carry out the separation of meta- and para-cresol on the industrial scale.

At the Gennevilliers works plant had been put down for the purification of naphthalene and the manufacture of alizarin. The crude naphthalene is recovered from the tars by cooling, pressed into cakes, re-melted, purified, and pressed. The installation for the purification of anthracene and its conversion first into anthraquinone and then into alizarin is of quite recent establishment.

Spent Oxide in the Manufacture of Sulphuric Acid.—A note by M. Lindet, the President of the French Society for the Encouragement of National Industry, is published in the "Journal des Usines à Gaz." It contains brief particulars of the use made in war time by the Société d'Eclairage, Chauffage, et Force Motrice of spent oxide as a substitute for pyrites in the manufacture of sulphuric acid. Compelled during the war to make their own acid for the production of sulphate, and faced with the difficulty of obtaining pyrites, they used spent oxide from the purifiers containing up to 50 p.ct. of sulphur. Admixture of sawdust was found to present no difficulty in the use of the oxide in the chambers. Oxide which had undergone several revivifications contained only 5 to 6 p.ct. of cellulose, and was found to burn satisfactorily in the Herrensdorf furnaces. The quantity of acid produced per 24 hours was about two-thirds that obtainable with pyrites, against which was placed the relatively small cost of the oxide. The burnt material was found to have the same value as that left by the pyrites.

BLACKPOOL CONFERENCE OF THE B.C.G.A.

Blackpool was the venue of a conference convened by the Manchester District Committee of the British Commercial Gas Association, which was held in the Town Hall on Friday afternoon. Alderman William Kay, J.P. (Lord Mayor of Manchester and Chairman of the Manchester Gas Committee), presided over a large attendance of representatives of the industry drawn from different parts of Lancashire, Yorkshire, and Derbyshire.

A Welcome.

Alderman Heap (in the unavoidable absence of Alderman A. Lindsay Parkinson, M.P., Mayor of Blackpool) extended, on behalf of the town, a cordial welcome to the members of the conference. He said that nothing would have pleased the Mayor better than to have been present at a business meeting of this description. He had that day learned many things regarding the objects of the British Commercial Gas Association. It was strange to him that, though so much money had been spent in carrying out the objects of the Association, and though he had been in municipal life for thirty years, yet the previous day was the first time that he had heard of the Association. This only pointed to the fact that they had a great deal of work before them. In the interests of the gas industry, it was well that they should persevere in their efforts. They had a Gas Manager at Blackpool (Mr. William Chew) of whom they were proud. They had had none but the name of Chew connected with the management, and they had not suffered. They had always had an up-to-date gas undertaking.

Alderman Kay thanked Alderman Heap for his kindly welcome. The British Commercial Gas Association owed a debt of gratitude to Blackpool for the opportunity of holding the conference there. The word "Blackpool" stood for everything that was successful in the work of bringing the merits of the town to the notice and attention of the general public. He wanted to remind the gathering that the Association was even yet but in its infancy. It was about seven years ago that the British Commercial Gas Association held the first conference in Manchester. The objects of the Association were co-operation in the strictest sense of the word, and the success that had been met with had been proved right up to the hilt. They had come on, until to-day they represented something like 85 p.ct. of the whole of the gas industry of the country. The war had come along, and had stopped their progress as an Association; but it had not stopped the members of the Association doing their best towards the successful prosecution of the war. With the gas industry, in no small measure, lay the responsibility for the great success that had been achieved. It was a matter of history to-day that in 1913 Mr. Newbigging and himself went to Berlin, and there for the first time they saw the product toluol. In 1914, with the success met with by the Germans in the use of high explosives, they had reason to know exactly what toluol was. He was bound to say that there was not a great deal to learn of scientific methods of gas making from the Continent; but there was a great deal to learn in the utilization of the bye-products. In his concluding remarks, the speaker stated that the future before the gas industry, in his opinion, was never brighter than now. He felt perfectly sure that conferences of the kind being held went a long way in effecting a profitable interchange of opinions.

Work and Policy.

Mr. F. W. Goodenough (the Chairman of the Executive Committee), at the conclusion of the Chairman's address, outlined the work and policy of the Association. Mr. Goodenough's statement was, in effect, similar to that delivered at previous conferences, and already reported in the "Journal."

Alderman F. S. Phillips (Salford) moved a hearty vote of thanks to Mr. Goodenough for his address. He himself was a member of the Association, and had been from the beginning. Someone had just said to him: "You are as keen on gas as ever." He was, because he believed they had the right thing to offer to the public; and it was their duty to be keen in putting before the public the value of what they had to offer. They were told that some 35 million tons of coal—and they knew what a scarce commodity it had been—were burned in the households of the country, and burned without getting more than one-fifth of the value. If they would use gas in place of coal, there would be a very great change. They would not come from smoky Manchester, but from a bright Manchester; and they might do this at a very great saving, because one-fifth of the 35 million tons meant that only 7 million tons were being utilized—the remainder being wasted, and doing the utmost amount of mischief. There was never greater need for economy than to-day. He believed also that, with one qualification, the outlook for gas was never brighter. The qualification was that those whose business it was to make and sell gas should do their duty in informing the public as to the value of gas, in such a way that they could not fail to see that they might use gas to their own very great material advantage. Some of them who joined in the formation of the Association did so because they believed that the field of operations was an important one. At seven years of age, they now represented 85 p.ct. of the whole of the gas industry. Though this was very considerable progress, he was earnest enough to say he was not quite satisfied. The necessity for co-operation became all-important; and hence it was that he was not quite satisfied to think that there were 15 p.ct. outside the Association. True, they were the small undertakings; but for this reason they were in greater need of the help of their fellows. It did not depend upon the merits or justice of their case, if they were going to Parliament. It depended upon the strength of their representation. If they were weak, God help them; if they were strong, the strength as well as the justice of their cause carried them to a successful issue. If there were any present who did not belong to the Association, he wanted to convert them. If they could get the whole of the 15 p.ct. outstanding, they would be complete in representing the gas industry. He had been associated with Mr. Goodenough from the formation of the Association; and he had been learning from him all the time. There was a great deal he could teach all of them. They would be very foolish if they failed to utilize to the full the services which he offered them.

Mr. W. Chew (Blackpool), who seconded the motion, said that, so far back as 1914, it had been the intention of the Blackpool Gas Committee to join the Association. It was not through any lack of knowledge of the existence of the Association that they had not joined earlier than they did. Blackpool, of course, depended a great deal upon gas for catering purposes; and it had been necessary to have a low-priced gas, so that people could be lavish with it. The result was that gas was used pretty freely. During the time the Corporation had had the gas-works, they had given £300,000 to the relief of the rates, which was more than the works cost. The Committee at their last meeting decided to join the Association; and he hoped that the business that would accrue would be of a profitable character.

Councillor Waddington (Halifax) supported the vote. The Halifax Corporation, he said, were more or less alive, and more or less asleep; and it was with great difficulty that one could get the Gas Committee to understand why they were members of the Association. The Gas Committee did not understand the salesmanship of their commodity; and this statement applied more or less—and possibly more—to every gas undertaking in the country. Too many chairmen, and too many men on gas committees, did not understand salesmanship. All they understood was profit. In Mr. Goodenough, they had a very reliable man at the head of affairs. Mr. Goodenough had so much insight and imagination, that he could teach them a good deal. They were told, and told pretty clearly, that gas had a thousand and one uses; and it was to their interests to belong to a body that could teach them something about gas. It was the great function of members of gas committees, if they could learn it, to realize the responsibility regarding the supply of their commodity.

Mr. Goodenough, in acknowledging the vote, said he was glad to know that Blackpool had joined the Association.

GAS EQUIPMENT AND THE HOUSING QUESTION.

Mr. Samuel Tagg (Preston) then opened a discussion on this subject. He said:

I have been asked to open a discussion on "Gas Equipment in Relation to Housing Problems." This subject, I consider, can be divided into a consideration of the problems created by the National Housing Scheme and the general question of the future policy of the industry in face of the Government proposals regarding electricity. With regard to the former, it is of the utmost importance that the merits of gas appliances should be brought to the notice of every housing authority in the country, as the equipment in any given area will for some time be regarded as a standard to be followed. The gas undertakings of Lancashire are in a particularly favourable position to urge and secure the fullest recognition of gas, as about three-quarters of the gas consumed is supplied by local authorities who have over £6,000,000 invested in their works. The "B. C. G. A." have published a large quantity of valuable matter dealing with the question, and every gas authority should see that it reaches those responsible for the housing schemes.

The standard to be aimed at is gas for all lighting, heating, and cooking purposes, except possibly the heating of the living room, for which coal or coke is the more economical fuel. The provision of a gas-cooker enables the kitchen range to be dispensed with, and an open coal-fire with back-boiler fitted in its place. A gas-heated boiler, with economy valve to allow of the supply of small quantities of water, should be connected to the back-boiler to provide hot water during the summer time. Gas-fires should be fixed in the parlour and principal bedrooms, to meet occasional needs; and the equipment of the house would be completed, from a lighting and heating point of view, by the provision of modern inverted incandescent burners in each room and a gas washing-boiler in the scullery. The more general use of gas as a domestic fuel in place of coal will materially improve the atmosphere of our towns, and add largely to the health of the community.

With respect to the future policy of the industry, we must ask ourselves whether past efforts have been sufficiently vigorous and successful. Ten years ago my Directors decided to adopt a more active policy in regard to the sale of appliances. To reduce the cost of renewals, and to facilitate the work generally, the appliances sold were confined to those of one maker only; and in view of the heavy capital expenditure of the Company, they were sold outright below cost price, and no charge was made for fixing. Central and branch show-rooms were opened, and the usual publicity policy followed. In ten years over 14,000 appliances were sold, or twice as many as during the previous 25 years, and, in addition, 14,000 slot meters, with 12,000 gas-cookers, were installed. As a result, the sales of gas for domestic purposes show an increase of 40 p.ct., and the summer output is 60 p.ct. more. The latter new business is obviously very desirable as in many cases no profit at all is made during the summer six months—it is only the winter operations from which the year's profits are obtained. The increased output during the past seven years has reduced the capital per million sold by £194, representing (say) 2¾d. in reduced dividend and interest charges.

While the success that has attended the efforts of the past years is substantial, the results are probably only similar to other undertakings working on the same lines. What is to be the policy of the future in face of the Government scheme for the supply of electricity, and in view of the much higher cost of appliances? I think the answer is to be found in the figures revealed by the working of the Household Fuel and Lighting Order. The actual quantity of coal delivered in Preston for the domestic requirements of a population of 125,000, in the year ending April, 1918, was 170,000 tons. In addition, 10,000 tons of coke were used,

430,000,000 c.ft. of gas, and one million units of electricity—the total value of all fuels, at present prices, being £440,000, or 7os. per head. The equivalent value of the gas supplied is 23,000 tons of coal, taking the conversion factor of 18,750 c.ft.; and of this, 10,000 tons may be taken as representing lighting and the balance of 13,000 tons other domestic needs. For all requirements other than lighting the fuel consumption is equal to 193,000 tons, of which gas only represents 7 p.ct. This shows the extent of the field still open to us; and I think there is no reason why, in the near future we should not secure a much larger proportion of the domestic fuel load. The cost of coal has risen in greater proportion than the cost of gas; the efficiency and convenience of appliances, thanks to the researches and efforts of the makers, is improving each year; and it only remains for each undertaking to do everything within its power to encourage the use of gas.

Among recent improvements in appliances reference must be made to control valves fitted in gas-heated boilers, allowing either a portion or the whole contents of the storage cylinder to be heated, and to the hot-plate efficiency of the new "Eagle" range, which is 50 p.ct. higher than that ordinarily obtained. So far as the consumer is concerned, this is equal to a reduction in the price of gas of one-third; and if this had been rendered possible by any new process of manufacture, I am sure it would have excited more interest than is aroused by the improved design of appliances.

Further encouragements to renew our efforts to secure more business is to be found in the wholly admirable report to the Institution by Sir Dugald Clerk and his colleagues, which shows the waste of coal involved in any attempt to substitute electrical energy for the coal used for domestic purposes on the one hand, and the economy that would follow the replacement by gas. I think that a further investigation should be undertaken on the basis of cost to the consumer, as the comparisons in the present report refer solely to thermal efficiencies.

This is not perhaps the occasion to consider in detail the methods to be adopted to secure new business; but I should like to urge the value of well-fitted show-rooms. These should not be merely attractive store rooms for gas appliances, but should display them fitted under the best conditions, properly connected into permanent flues; and we should endeavour by these means to raise the status of gas appliances. The only other recommendation I make is to become an active and full subscribing member of the "B.C.G.A." If one is receptive, the stimulus supplied by the genius of the Chairman of the Executive Committee, the enthusiasm and able advocacy of the Editor of the Bulletin, and the Secretary of the Association will prove of tremendous assistance. The highest compliment that we can pay them is to use the resources of the Association to the fullest possible extent.

Mr. E. UPTON (Liverpool), in moving a vote of thanks to the author, said the British Commercial Gas Association meant efficiency in every sense of the word, in the sale and distribution of gas. They found that they were up against a great many difficulties; and there was no doubt about it that, now they had got going, they had set other organizations thinking. It was a very good thing that they had started the Association, because there was now a direct connection between gas and the housing schemes that were contemplated. They much wanted to improve the conditions under which the management of the home was carried on; and if they were able to get gas in the home for most of the purposes for which it could be utilized, they were going to make the work of the housewife much easier. They must not let the opportunities pass. They were bound to go on and push with all their possible strength, particularly in connection with the housing schemes. Mr. Tagg had pretty well covered the ground. He had much pleasure in proposing a vote of thanks to the author for his address.

Mr. R. WATSON (Doncaster), in seconding the motion, said there had been several papers recently on the subject; but, notwithstanding, Mr. Tagg had achieved success in bringing something fresh into his address. The question of the relationship between gas equipment and housing schemes was at the present time an exceedingly important one; and it provided a unique opportunity for developing the consumption of gas for domestic purposes. The opportunity was not to be neglected; and they would be unwise if they did not follow the advice that had been given by Mr. Tagg and other speakers in pushing the use of gas appliances for all purposes in the houses that were to be erected. This, also, would have an indirect effect upon existing houses, whose occupants would be bound in the long run to get their landlords to instal appliances of a similar character.

Alderman ISHERWOOD (Macclesfield) believed the gas industry had a great future before it, provided that gas, and the many purposes to which it could be usefully applied, were brought in an effective manner to the notice of consumers.

Mr. W. B. M'LUSKY (Halifax) said he was reminded by the step the Blackpool Corporation had taken in joining the Association of the saying that "The Scotchman never casts his bread upon the water until the tide is coming in." Mr. Chew had just told them that his Committee were going to take advantage of the incoming tide. He was not going to talk about the big things at all. In his own home, before the war, they used both coal and gas. Since the war they had used nothing but gas. Although the price of gas had increased by 60 p.ct. since the date of the change from coal to gas, the actual increase in cost had been only 40 p ct. One point he wanted to mention in connection with the new houses. It was common knowledge, but not common experience, that rooms should be ventilated from the top; and some twenty years ago he had had automatic valves fitted above the picture moulding, and found them of great service. They were not so essential in houses where gas was consumed; but they were essential where electricity was used. There might be an attempt to instal electric lighting in the new houses. It had been clearly demonstrated, however, that better hygienic conditions were obtainable by the use of gas. If every housewife were to use gas for washing on washing day, the consumption of gas would double, and gas undertakings would be sending out as much gas in two or three hours in the morning as they did for the rest of the 24 hours. Regarding the testing of gas-fittings, he remarked that water-fittings were tested because any loss through leakage came out of the pocket of the corporation, whereas loss of gas from a similar cause was paid for by the consumer. This, however, was no reason why gas-fittings should not be carefully tested. They did not do enough in the way of inspection and maintenance.

The vote of thanks was carried with acclamation; and Mr. TAGG suitably acknowledged the motion.

SALES ORGANIZATION.

Mr. GOODENOUGH said that time would not permit the reading of Mr. F. H. Holland's paper, outlining a scheme for sales organization; but an opportunity of doing so would probably be afforded in the near future. He moved a vote of thanks to Mr. Chew and his son for their great assistance in arranging for the conference, and to Alderman Kay and Alderman Phillips for presiding.

Mr. H. KENDRICK seconded the motion. Referring to Mr. M'Lusky's remarks regarding maintenance, he said he would like the members to take into consideration that, when they were endeavouring to get the various Housing Committees to take-up the question of gas for lighting and heating in connection with housing schemes, success would lie in the attention that was paid to the appliances used. If the gas appliances were allowed to get into a bad condition, it would militate against the use of gas; whereas if the appliances were maintained properly, it would go a long way to ensure the success of the gas campaign. The provision of a larger maintenance staff would be necessary, and would naturally mean more expense; and the results would have to be looked for in the future. These results, however, would most certainly come.

Alderman PHILLIPS briefly responded.

American Views on Municipal Ownership.

At last month's meeting of the Pennsylvania Gas Association, Mr. Walton Clark delivered an address in which he discussed the question of whether municipal ownership of gas properties in America would promote the general good—attempting, as he himself declared, "a philosophic attitude, and giving little attention to actual experiences." The address recalls the fact that in 1906 the National Civic Federation created a Commission for the study of the effects of municipal ownership where so far adopted, and of their influence on the general welfare. After two years' investigation of the operation of municipally owned and of privately owned gas plants, each of the several pre-committed advocates of municipal ownership among the membership of the Commission signed a report that did not contain a word of endorsement of municipal ownership—even as existing under the favouring conditions stated to obtain in Glasgow, Birmingham, and Manchester—and no statement that it ever did, ever would, or ever could result in good to the citizens. Going from argument to argument, Mr. Walton Clark says he thinks that, whether we reason from the principles that we know govern men in their actions to what results can be expected from adding to the inevitable duties of council men the oversight of municipally-owned industries, or whether we, as did the National Civic Federation Commission, reason from individual and specific experience to a generalization, the result is the same—municipal ownership stands condemned.

Production of Gas from Lignite.

Abstracts in the "Journal of the Society of Chemical Industry" show that Dr. Karl Bunte contributed to Vol. LXII., pp. 34-6, of the "Journal fur Gasbeleuchtung" the results of some gas-making tests with Hungarian "Totis" lignite carried out in 1909. The air-dried lignite contained 10·58 p.ct. of moisture, 9·88 p.ct. of ash, and 79·54 p.ct. of combustible matter with the following percentage composition: Carbon, 72·93; hydrogen, 5·98; oxygen, 16·27; nitrogen, 1·12; sulphur, 3·70. Each retort received a charge of 120 kilos.; and the distillation was continued for four hours at 1200° to 1250° C. The yield of gas per 100 kilos. of lignite was 38·8 cb.m. at 1200° to 1220° C., and 40·0 cb.m. at 1220° to 1240° C., or, excluding carbon dioxide, 34·1 and 35·2 cb.m. respectively. After the usual cooling, washing, and purifying, the gas obtained at 1215° C. had the following percentage composition: CO_2, 12·6; C_nH_m, 4·0; CO, 14·1; H_2, 45·2; CH_4, 23·5; and N_2, 0·6. After purification with soda-lime the yield per 100 kilos. of coal was 34·3 cb.m.; sp. gr. ·460; gross calorific power 5950 calories; illuminating power (150 litres per hour, slit burner), 11·8. After purification the gas still contained, per 100 cb.m., 220 grms. of sulphur in the form of carbon bisulphide and organic compounds. Even after further purification with lime, the sulphur could not be reduced below 188 grms. per 100 cb.m., although wood charcoal reduced it to 40 grms. On this account the gas was unsuitable for use; but it is suggested that other kinds of lignite containing less sulphur might prove more satisfactory in this respect. The residue in the retort averaged 45·5 kilos. from 100 kilos. of lignite. It was a grey pulverulent mass which required a forced draught for burning. The tar (average yield, 4·64 p.ct.) was fluid of 1·19 sp. gr. On distillation, 25·9 p.ct. distilled between 170° and 270° C., and 15·6 p.ct. above 270° C., while the yield of pitch was 58·5 p.ct. There was also obtained 14·7 kilos. of gas-liquor containing 1·18 p.ct. of ammonia; the total yield of ammonia being 228 grms. per 100 kilos. of lignite. Cyanogen (45 grms. of HCN per 100 kilos.) was also separated. Preliminary drying would be necessary to render many kinds of lignite suitable for distillation.

REGISTER OF PATENTS.

Furnace Roofs.—No. 124,077.

Fletcher, J, E., of Dudley.

No. 5548; March 30, 1918.

This invention has reference to brick or block arched roofs of furnaces; and more particularly those where the temperature within them, when in operation, is very high.

It has been found that refractory bricks used in such arched roofs fuse more readily under pressure than when free from load; and the patentee claims to have found that it is the pressure brought to bear on the active faces and edges of the bricks by the expansion due to the heat in working which, expanding the arch, lifts it at the centre (the outward thrust being taken by the usual tie bolts), which is the cause of fusing in such arches. Under this condition the inner portions of the radial faces of the bricks are severely crushed and crumble at the inner edges, whereas the outer and thicker portion of each arch brick, being cooler, does not expand proportionally to the thinner inside ends of the bricks, and there is a slight opening at the outer portion of each joint.

The thrust of the arch thus falls on the inner ends of the joint faces of the bricks, which, owing to this concentrated pressure or load, fuse most readily on the face presented to the furnace flames. Furthermore, arch bricks are rarely true to the correct radial shape required for perfect thrust distribution; and thus the inner faces often touch at the joints, while the outer faces are not in contact. Then, on heating such a structure, the bearing pressures on the inner parts of the joints are frequently severe enough to cause early fracture of the brick corners, and so induce rapid fusion, and generally a short life of the roof. In addition to this, the ususl handling of brittle refractory fire-bricks helps to the damaging of the inner edges of the arch bricks, which, under heat, effect accentuate the pressure troubles described.

According to this invention, in arches or roofs of furnaces constructed of blocks, each block is continuous—*i.e.*, undivided—and rounded on its inner and flame or heated face.

Distillation of Coal.—No. 124,294.

Lamplough, F., of Feltham, and Oil Extractors, Ltd., of Victoria Street, Westminster.

No. 5511; March 28, 1918.

In the distillation of coal for the production of oil gas or illuminating gas, the patentees remark, it is well known to inject into the retort a stream of producer gas, water gas, or the like in a heated condition. Owing to water gas being already carburetted, however, "it is not a suitable vehicle for use in the distillation of coal; also, it is so covetous of light hydrocarbons that they cannot be recovered in the form of spirit even by scrubbing the gas." It has also been proposed to admit steam with the heated gas into the bottom of the retort; and it has further been proposed to pass steam superheated in a regenerator (or otherwise) into the lower part of the heated zone of the retort—in some cases the waste heat of the setting of the retort being utilized for superheating the steam.

According to their invention, the process for the distillation of coal consists in preheating the coal—until volatile products commence to be given off—by means of the gaseous products of combustion obtained from burning fuel (for example, coal burnt in a furnace); then passing superheated steam through the preheated coal when sufficiently hot, as indicated by the giving off of the volatile products, and thereby distilling off the volatile content of the coal and obtaining it mixed with steam; and finally separating the volatile products from the steam.

Conveniently, the steam is superheated by direct contact with the hot gaseous products of combustion after they have left the fuel, and is passed, together with the gaseous products of combustion, through the sufficiently preheated coal, and the volatile products from the coal are finally separated from the mixture of steam and the products of combustion thus obtained.

Preferably, after the more volatile products have been distilled off from the coal, the temperature of the remaining solid carbon contents is raised (say, by temporarily shutting-off the steam and raising the temperature of the furnace) until it is sufficient to burn the remaining carbon content to carbon monoxide; and then either steam alone or together with the gaseous products of combustion at the higher temperature is passed through the remaining carbon content. The less volatile products produced by this application of higher-temperature steam and products of combustion are conducted from the still separately from the more volatile products for the recovery of ammonia, and the use of carbon monoxide as a combustible.

The apparatus for carrying the process into practice preferably comprises a still, a furnace, a superheater of refractory material (brick-chequer-work) constituting a flue connecting the furnace to the still, and means for supplying steam to the furnace end of the superheater. Other features of the apparatus are described in conjunction with an elaborate drawing, fully lettered.

The process can be worked continuously by feeding in coal at the top of the still, and withdrawing the partially spent coal by a roller grate at the bottom—air-locked devices at the top and bottom preventing access of air; or, if preferred, it can be worked intermittently as follows: One charge of coal having been distilled, the steam is shut-off and the temperature of the furnace raised until the partially spent coal in the still commences to burn to carbon monoxide. Steam is then admitted as before, and completes the distillation of the coal. But the volatile and gaseous products are carried off separately from those previously removed; these products being utilized to provide ammonia and carbon monoxide, which can be utilized for heating purposes. After this second heating, the spent coal is discharged from the distilling chamber, and the still recharged. The first heating is again proceeded with for extracting the more volatile substances at a relatively low temperature; and this is afterwards followed by the second heating to a higher temperature, and so on.

Retorts.—No. 125,496.

Rew, R. J., of Exeter.

No. 6313; April 13, 1918. No. 8438; May 21, 1918.

This invention has for its object to adapt retorts for the production of water gas by the admission of steam during the final stages of carbonization or (preferably) after the carbonization has been effected. The invention specially relates to the subject-matter of a prior patent —No. 124,247.

According to one part of the invention, in its adaptation to horizontal or inclined retorts there is formed within the bottom of the retort a longitudinal duct or trough (fig. 1) extending throughout the length, or part only, of the retort. The trough has a cover plate, and steam, highly superheated to a degree approximating to the final temperature of the charge in carbonization, is admitted from either or both ends at a slight pressure. The central part, at which the steam is admitted through the cover plate, may be raised above the normal bottom level of the retort so as to prevent any large quantity of liquid matter passing into the duct. This part of the invention may be carried into effect in various ways illustrated in the specification.

According to another part of the invention, the steam which passes into the duct may be produced and superheated within a superheater attached to the retort, arranged in the heated zone. The steam under a slight pressure, enters the superheater; passes through the heating chambers in the superheater; then enters the duct or channel within or beside the retort; and is finally distributed in the retort at approximately the same temperature as that of the incandescent coke. If water be used, an iron pipe may be inserted into the first of the heating chambers for the production of steam, which is then superheated in its passage through the further heating chambers.

Such a superheater (illustrated in fig. 2) is adapted to be inserted into the front wall of the setting. Such a form of superheater, made of cast iron, may be readily applied in position without any derangement of the setting. Any number of tubes may be provided in the tubular fitting, and any number of partitions whereby the steam will pass through several compartments. Where water is admitted into the superheater, ridges or weirs may be provided near the inlet pipe to prevent the passing through of any surplus water. Baffles, ledges, or

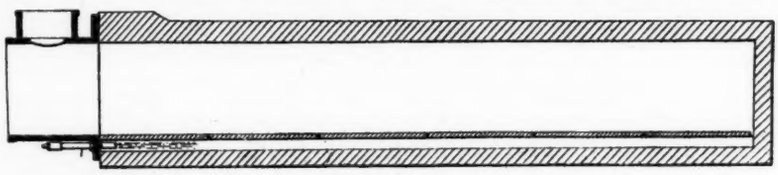


Fig. 1.

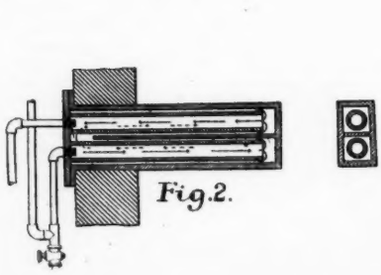


Fig. 2.

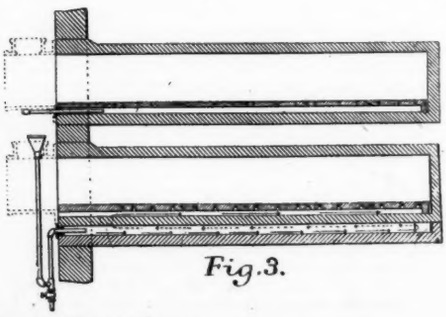


Fig. 3.

Rew's Steam Treatment of Retort Charges.

projections may also be provided on the internal surfaces to ensure the utmost radiation and contact of the steam with the externally heated surface of the outer casing.

When making the channel or duct of separate blocks or tiles, two or more communicating channels may be used by which steam may be led to and fro in the length of the retort before its discharge into the retort. Such a construction is illustrated in the lower part of fig. 3, in which a longitudinal series of blocks are mounted beneath; the retorts being provided with two parallel channels or ducts, one of which admits steam or water, which passes rearwardly in the direction of the arrow through a communicating hole in the partition dividing the ducts, and thence forward (as indicated by the dotted arrows) through a hole communicating with the main duct within the retort. From this duct the superheated steam passes into the retort through the holes in the cover plate. With such an arrangement the use of a separate superheater may be dispensed with.

Laying Pipes Underground.—No. 124,820.

ALLEY, S. E., of Polmadie, Glasgow.

No. 5909; April 25, 1916.

This invention relates to a system of laying pipes underground from the face of a trench or cutting—the pipes being forced endwise, each by the succeeding one, until the desired length is laid. A head or nozzle device is fitted to the leading pipe, as described in patent No. 13,709 of 1915, to guide this length of pipe and ensure that deviation from the desired line is maintained at a minimum. When the pipes are being forced through the soil, their external surface is lubricated by the addition of a little water or other liquid to the soil surrounding the pipes, thereby facilitating their passage through the soil, and consequently lessening the stress on the apparatus used to force the pipes through the soil and increasing the speed with which they may be laid.

The lubricating device is essentially a length of pipe having within it a fluid-tight compartment fitted with inlet and discharge valves. The compartment is partly filled with water or other liquid, the remainder of the space holding air forced in until any desired pressure is reached. The forward end of the pipe carries the guiding head or nozzle described in the earlier patent. Before commencing to lay the pipes, the discharge valve in the forward end of the compartment is opened more or less, which allows the air pressure to force the liquid out of the compartment at any desired rate; and the liquid, mixing with the soil, lubricates the external surface of the succeeding lengths.

Gas Heating-Apparatus.—No. 124,959.

ALLEN, W. J., of Bristol.

No. 9251; June 5, 1918.

This invention has reference to a gas heating bunsen burner provided with holes in the side through which a mixture of gas and air issues beneath a circular fire plate or spreader, between which and a conical hood or bell above it is a space through which the air and products of combustion pass—means being provided for adjusting the relative proportion of air and gas consumed.

The invention has for its object to provide means to avoid any accidental contact of the flame with material outside the burner—"thereby providing a safety device." This consists of a metal (or other non-inflammable) cage adapted to surround the burner and the flame in such a position that access to the flame is not readily possible.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for May 14.]

Nos. 11,117—11,816.

ASCOUGH, W. H.—"Box for receiving and cooling coke." No. 11,754.
BAGLEY, S.—"Taps for controlling flow of viscous liquids." No. 11,657.
BALFOUR, J. W. B.—"Burners." No. 11,133.
BARTER, C.—See Bagley. No. 11,657.
COWBURN, F. C. & T.—"Production of gases under pressure." No. 11,212.
DOHERTY, H. L.—"Coal-carbonizing furnaces." Nos. 11,773, 11,774.
FORSTER, J. D.—"Gas-meters," No. 11,806.
FOSTER, J. P. S.—See Ascough. No. 11,754.
GREENFIELD, J.—"Indicating-mechanism for gas-meters." No. 11,778.
KELLER, H.—"Apparatus for lighting gas-lamps." No. 11,812.
LEA, D. H. & F. M.—"Atmospheric gas-burners." No. 11,172.
MAGNUS, B. J.—"Taps or valves for controlling fluids, gases, &c." No. 11,656.
OXSPRING, R.—"Means for controlling heating of gas-stoves, &c." No. 11,290.
ROUSE, E. E.—"Gas-burners for water-heaters." No. 11,668.
ROUSE, E. E.—"Water-heaters." Nos. 11,669, 11,670, 11,671.
SIMON, L. J.—"Apparatus for heating liquids by gas." No. 11,248.
SNELL, C. SCOTT-.—"Refractory elements in gas-fires." No. 11,519.
SPRAGUE, W.—"Connecting new or repair of broken lead, &c., pipes." No. 11,281.
STAPLETON, A.—"Gas-fires." No. 11,664.
WADE, H.—See Greenfield. No. 11,778.
WALL, H. A.—"Gas-cookers." No. 11,455.
WEST, J.—"Retorts for distillation of carbonaceous materials." No. 11,413.
WESTWOOD, F., H. B., & S. C.—"Acetylene-gas generators." No. 11,724.
WILD, W.—See West. No. 11,413.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Chairman of Committees informed the House that the opposition to the Sheringham Gas and Water Bill had been withdrawn, and the Bill was committed to the Unopposed Bills Committee.

The Huddersfield Corporation Gas Bill was reported, with amendments.

The Dover Gas Bill was presented, read the first time, and referred to the Examiners.

The Northampton Gas Bill was read a second time, and committed.

HOUSE OF COMMONS.

Progress of Bills.

The Stourport Gas Bill was read a second time, and committed.

The Examiners reported that the Standing Orders applicable to the Hartlepool Gas and Water Bill have been complied with; and the Bill was ordered to be read a second time.

The Lichfield Gas Company have petitioned to be heard against the Walsall Corporation Bill.

The Bedwelty Urban District Council Gas Bill was presented, and read the first time.

HUDDERSFIELD CORPORATION GAS BILL.

This Bill was sent forward for third reading by the Unopposed Bills Committee of the House of Lords on Tuesday last. It provides for the purchase by the Huddersfield Corporation of the undertakings of the Longwood and Slaithwaite Gas Company and the Kirkheaton, Dalton, and Lepton Gas Company. The former was incorporated in 1875, and the latter in 1887; the purchase agreements being scheduled to the Bill. The purchase price of the Longwood Company is £117,595, and of the Kirkheaton Company £6600. The Corporation also, by the Bill, seek powers to raise an additional £100,000 for the construction of gas-works and mains.

LEGAL INTELLIGENCE.

HOUSEHOLD FUEL AND LIGHTING ORDER PROSECUTION.

Excessive Use of Gas.

At Brighton, last Tuesday, before the Borough Justices, Michael Jacobs, No. 86, Marine Parade, was summoned for consuming more gas than allowed under the Household Fuel and Lighting Order, 1918, during the quarter ending March 25 last.

Major T. BAXTER MILNE, who prosecuted, said the case was brought by the Controller of Coal Mines on information supplied to the Local Fuel Overseer. According to the particulars which the defendant filled in under the Order, he was allowed 4½ tons of fuel, which he elected to take in the form of 3¾ tons of coal as gas, ¼ ton as electric light, and 1 ton of coal as coal, for the twelve months. A certificate was issued to the Brighton and Hove Gas Company to supply him with 16,250 c.ft. of gas in any quarter; the assessment being made on the year's consumption, in order that the consumer might be protected. There was a proviso that not more than one-third of the total amount should be consumed in any one quarter; but defendant's meter showed that on Jan. 1, and again on April 1, he had actually used 55,500 c.ft., although the figures allowed for the year, with the extra 25 p.ct. permitted, were 60,937 c.ft, or not more than 20,310 c.ft. per quarter. He had practically used the whole of his year's supply in one quarter. As a matter of fact, he committed a similar offence in the December quarter; but no proceedings were taken in respect of that quarter, although he was notified by the Gas Company that he had exceeded his allowance. A meter reading taken on the previous day showed that, since the beginning of April (about half the quarter), he had used 25,700 c.ft.—more than a quarter's allowance; and it was asked that the Bench would take all these three offences into consideration to obviate the necessity of further proceedings.

Defendant, who pleaded guilty, said the illness of his wife had been the cause of the excesses. He had a doctor's certificate to show that there must be a fire in her room night and day; and the room she occupied was an exceptionally large one. He pointed out that, though he was entitled to a ton of coal, he had not had it in order that they might use extra gas for heating. On one occasion, when one of his sons was home on leave, they had to sit with their overcoats on.

Major MILNE said the room occupied by defendant's wife was 27 ft. by 22 ft.; and in the assessment it had been treated as two rooms. The Gas Company had returned defendant's consumption for the previous year as 169,200 c.ft., and defendant had complained that this was inaccurate. He had, in fact, ignored the whole regulation.

The CHAIRMAN, after consultation, announced that, as this was the first case of the kind to come before the Court, the Bench had given it very careful consideration. It was a serious case, defendant having consumed about 140 p.ct. more gas than he was entitled to use. Defendant would have to pay a fine of £20 and £5 costs.

In reply to the defendant, the Chairman said the Bench had taken into account the fact that he had not had the ton of coal to which he would have been entitled.

MISCELLANEOUS NEWS.

TRAINING THE RETURNED SOLDIER.

Birmingham Day School for Demobilized Gas-Fitters.

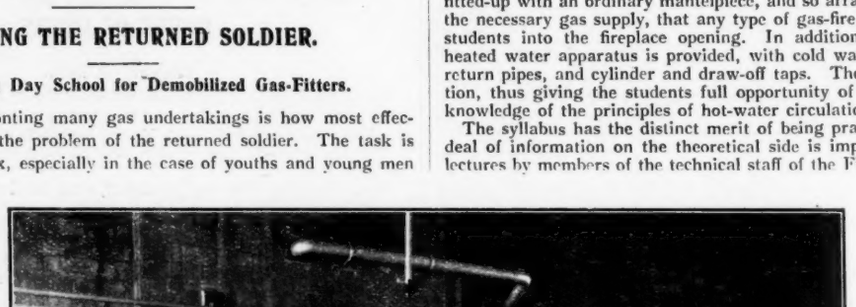
A question confronting many gas undertakings is how most effectively to deal with the problem of the returned soldier. The task is difficult and complex, especially in the case of youths and young men who have been serving with the Colours for a period of four years or more, and who in the autumn of 1914 were learning the trade of gas-fitters. The difficulty is obviously greater in those cases where the gas-fitter's assistant or apprentice (say) at 19 years of age joined-up. He returns 23 years old—when, in obedience to local trade union regulations, he must be paid the wages of a fully-qualified fitter (approximately 1s. 8¼d. per hour, or £3 19s. 8d. per week); and in the ordinary way he would be expected to undertake all kinds of gas-fitting work. But having lost a very important part of his training period—possibly the most important—it has been felt by the Birmingham Gas Department that a course of intensive training, of from four to six weeks' duration, is necessary in order that a young man may be able satisfactorily to undertake all classes of gas-fitting work in private or business houses. With the approval of the Gas Committee, and the co-operation of the Municipal Technical School, the Fittings Superintendent (Mr. R. J. Rogers) has instituted a scheme of training whereby the demobilized men of the Fittings Department are able to obtain instruction in a day training school.

A representative of the "Journal" recently paid a visit to the school, which is situated in the Municipal Technical School Extension, Rosebery Buildings, John Bright Street, Birmingham. The school consists of a large workshop and a small lecture-room, each well suited for the purpose. The workshop is fitted with various types of apparatus and tools relative to the gas-fitters' trade. In fact, the tuition is of an eminently practical and theoretical character. There are working facsimile models of all sorts of equipment; and it is insisted that the work shall be done by the student. He must handle and shape the material required.

Among the employees of the Fittings Department (excluding the clerical staff) who served with the forces during the war were upwards of a hundred gas-fitters 21 years of age, and approximately ninety fitters' assistants. The training is intended primarily for the latter; and it is worth noting that the ages of the first twelve men passing through the school was 23. The students are keen about their work; and as they are passed out another batch of twelve will enter the school. The prospective students are engaged on district jobs with senior workmen (on the fitter and apprentice principle); but after the school course, they are themselves able to undertake independent or "solo" work. It should be pointed out, however, that a man's training does not end when he leaves the school. For a certain time he is attached to a particular district, the standard of his work being carefully noted by an inspector; and later he is transferred to another district in which the character of the work required is different from that in the district in which he was first engaged. In this way, all-round training is assured.

In the centre of the school shop are large work benches, with tool vices and drilling machines; and side benches are fitted with ordinary work bench vices, to enable the youths to have practical tuition in bench vice work. A bench is fitted with various types of wet and dry meters, these having glass front, sides, and top; and each meter is connected to a rail of burners fitted over the bench. When gas is passing through the meter, the student is able to note the interior workings. Adequate facilities are also provided by which the workman-student may familiarize himself with all types of modern gas-fires. Sections are shown on benches; while the chimney-breast is fitted-up with an ordinary mantelpiece, and so arranged, complete with the necessary gas supply, that any type of gas-fire can be fitted by the students into the fireplace opening. In addition, a system of gas-heated water apparatus is provided, with cold water supply, flow and return pipes, and cylinder and draw-off taps. The system is in operation, thus giving the students full opportunity of obtaining first-hand knowledge of the principles of hot-water circulation.

The syllabus has the distinct merit of being practical; while a good deal of information on the theoretical side is imparted by a series of lectures by members of the technical staff of the Fittings Department.



A Corner of the Workshop, showing Fire-grate used for Instructional Purposes, also Samples of Students' Work.

AUSTRALIAN GAS LIGHT COMPANY.

Half-Yearly Meeting.

The Half-Yearly Meeting of the Company was held at the Royal Exchange, Sydney, on March 31—Mr. G. J. Cohen (the Chairman) presiding.

The Chairman, in moving the adoption of the report and accounts, said that in his last address he referred to the decision of the Royal Commission appointed to inquire into the cost of production of gas by the Metropolitan Companies. In this connection, he anticipated that the additional revenue due to the authorized increased price would materially improve the Company's position. He was now pleased to draw attention to the financial condition as disclosed in the balance-sheet. It was matter for congratulation that the Company, by the payment of 4½ p.ct. for the half year under review, had made a total return of 8 p.ct. for the year; and also that they had been able to reduce the price of gas to 4s. 4d. per 1000 c.ft. as from Feb. 1. The Secretary (Mr. R. J. Lukey) entered upon nine months' retiring leave at the beginning of September last, after a long and honourable service with the Company; and the Assistant Secretary, Mr. C. U. B. Gurnett, was appointed to act during the period. The business of the Company—notwithstanding war conditions—showed continued expansion; the increase in the consumption of gas being 16 p.ct. over that of the corresponding period of last year. With regard to the gas consumers, there had been a net increase of 3936; the number at present being 145,494. Had it not been for the impossibility of securing meters, and the inability to obtain mains for extensions, these increases would have been considerably augmented. He was hopeful that the meter difficulty would rapidly disappear. The Company's contractors were doing everything possible towards this end. The Company were still in occupancy of the Kent Street station. This had been thought advisable, in view of the necessity for some stand-by on account of the increase in the demand for gas. More than equivalent provision had been made at Mortlake to replace the output from Kent Street; but, in order to meet this demand, it had been found necessary to further extend the plant at Mortlake.

The report was adopted; and the dividend recommended was declared.

BOMBAY GAS COMPANY, LTD.

The Ordinary General Meeting of the Company was held on Thursday last, at the London Offices, Moorgate Street Chambers, E.C.—Mr. H. E. Jones in the chair.

The Secretary (Mr. A. Dickson, jun.) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

Business Little Affected by the War.

The Chairman said it was his pleasant duty to move the adoption of the report and statement of accounts. This was the first time the

shareholders had met after the end of the terrible war; for, although peace had not been actually signed, it would soon be. They had much to be thankful for. Happy was the nation that had no history. Fortunately for the Company, the war had been so far removed from Bombay that—unlike the gas companies trading in this country and in Europe, especially in France (in the gas supply of which he was intimately concerned)—they had not felt anything more than just a back kick, and a moderate amount of excitement in connection with the war feeling. There had been a little of this in Bombay, and some rather riotous proceedings, purely political, and having nothing to do with their industry. They had had under these circumstances the great advantage of a comparatively undisturbed business, which continued to be as successful as it had been now for a good many years past. For another purpose, the Directors had been looking into the past. They found that in 1871, which was practically fifty years ago, the Company sold 57 million cubic feet of gas; while now they were selling 297 million cubic feet, which was well over fivefold of the amount sold in 1871. It would be seen from this that the progress of the concern had been rapid. He did not think it was necessary to go seriatim through the items in the accounts. The work of the Company had been as good as, and perhaps better than, ever. In the matter of works' repairs, a large amount of money had been spent; and there was an addition to the repair and extension of mains. This did not, however, mean that they had done in this direction all they could have wished to have done, if the cost of materials and wages had been favourably disposed towards the maintenance of the very high standard which was necessary to enable their officers to work advantageously. Therefore, they had had to reserve considerable expenditure for future years, when they hoped that the prices of material and labour would have come back to more normal figures. The report showed they were in a very favourable financial position. Instead of the £18,600, they carried forward last year, they would now have £23,533, after providing for the dividend at the rate of 8 p.ct., which they had been paying now for some years past, and which the Directors felt it only prudent should be continued while they had upon them all the uncertainties of the interference by the war.

FUEL AND POWER DISTRIBUTION.

Perhaps now the shareholders would like him to give his views as to the general outlook of gas undertakings. He was happy to tell them that the Company's experience was that, even in a hot country like India, the demand for an easily distributed fuel was growing continually, and was ever pressing. In this country, the policy favoured by the Government appeared to be in the direction of electrical power; but they seemed to have overlooked another element in the matter. This was not only the importance of distributing power, but of distributing fuel—a convenient, labour-saving fuel for the many purposes of domestic service, and always essential to trade whatever its nature. To serve a large number of the population with fuel for domestic purposes preserved to them a great amount of business independent of trade. There had lately been some very important investigations made, and some very important reports circulated. They revealed facts well known to men interested in the science of fuel and the distribution of power; and for many years past, they had been noticed by their Chairman over and over again in various addresses. A fuel service such as people wanted for furnaces for trade purposes, for the creation of steam for the steam-engine, and so forth were matters which electricity could not accomplish, except at an enormous forfeiture. The forfeiture was involved in (if he might so term it) the backwardation of the process of converting coal into steam, of transferring the steam from the boiler to the engine, of converting it in the engine to power, and of utilizing the power in the dynamo; and then the circulation of the power by electric ways could not be disputed by competent authority to be cheap. However, for many purposes of power and on some grounds for lighting, electric energy was a competitor with gas; but if they tried to reconvert the power back again to heat, they had to sacrifice over again all the sacrifice made in getting the power from the coal originally. Boiling the matter down to a very short statement, something like four or five times as much coal was required to heat-up houses or to boil a kettle through the service of electricity as was required through the service of gas. Therefore, the shareholders would see that the position of gas in Bombay or anywhere else was perfectly safe so long as their business was derived from the domestic convenience and service of a large population, and from the trading areas where heat for furnace work was positively essential. The shareholders might not be aware that the Company in the East-End of London of which the Deputy-Chairman was the Chairman, supplied to-day, in the face of any amount of electricity, the gas to heat into a flux the metal for the purpose of coinage at His Majesty's Mint, as well as for the refining of metals at the Rothschild gold and silver refinery close by. This was a short illustration of the absolute truth of what he had been saying—that in the matter of fuel distribution, electricity stood in relation to gas in the ratio of four to one in respect of coal expenditure. Another element in the electrical scheme was concentration, which was an economy as well known to gas people as to electricians—the concentration in large works of the production of the distributable source of power and light. That was an economy which gas companies had realized by amalgamation, of which he personally had always been an advocate, the same as his fellow Director (Mr. Charles Hunt) in the South Suburban Company. In the Commercial Gas Company, they carried out amalgamations long ago. Some people were under the impression that the energy contained in a ton of coal—say, from the coal mines of Durham or Yorkshire—could be transmitted electrically to a centre where fuel was wanted in the South of England, say, some 200 or 300 miles away; but that the energy could be transported with anything like the same economy as could be obtained by transporting a ton of coal in the hold of a ship or in a railway wagon to a gas-works, was entirely out of the question. It must be remembered that besides the heat from the gas, gas undertakings carried to the doors of the people the fuel coke, to the roads the tar for making asphalted surfaces which were so pleasant and so generally desirable; and to the fields a fertilizer. It could therefore be held beyond all dispute that for all heating purposes coal would have to continue to be transferred from the collieries to great centres like London where the gas companies could deal with it better in the fashion in which it had been dealt with in the past than by attempting to transmit heat energy by wire. But it was not wise or prudent to have twenty little gas companies where they might have one large one, any more than it was wise or prudent to have twenty little electric supplies instead of one. The Government were assisting the electrical people; but then it must be borne in mind that the electric companies were not like the gas companies—they had never been chartered beyond a certain period; they had never had a permanent freehold of the business they got; they had always been bound to surrender the concerns to the local authorities under certain conditions, and without that consideration of goodwill which had been so profitable to gas companies in transferring their works to the public authorities. He feared he must not continue to traverse such a wide subject, however interesting it was. The accounts before the shareholders were extremely satisfactory; the working was very good; and they had improved the balance in hand. He formally moved the adoption of the report and accounts.

The DEPUTY-CHAIRMAN (Mr. W. G. Bradshaw) seconded the motion, which was unanimously carried.

A GOOD DIVIDEND FOR WAR TIME.

The CHAIRMAN moved the declaration of a dividend of 4 p.ct. (less income-tax at the rate of 4s. 6d. in the pound), making, with the interim 4 p.ct., 8 p.ct. for the year.

The DEPUTY-CHAIRMAN seconded the motion, which was also agreed to.

RE-ELECTION OF DIRECTORS AND AUDITORS.

The CHAIRMAN moved the re-election of Field-Marshal Sir Evelyn Wood, V.C., G.C.B., and of Mr. Bradshaw. He remarked that these two gentlemen were both public characters. Sir Evelyn was known throughout the breadth of the King's Dominions; and Mr. Bradshaw was known where finance and commercial knowledge were of significance. He stood second to no man in the City of London.

Mr. LOUIS PENNY seconded, and the motion was heartily agreed to.

Proposed by Mr. JOHN MITCHELL, and seconded by Mr. A. J. KINGDON, the Auditors (Mr. Spencer Gore Browne and Mr. Ernest Drew, F.C.A.) were re-elected.

A VOTE OF THANKS.

Mr. A. W. OKE proposed a hearty vote of thanks to the Chairman and Directors, the Engineer and Manager and staff in Bombay, and the Secretary and staff in London. He said that some time ago he had the pleasure of paying a brief visit to Bombay, and going round the works with Mr. Birch. This was after Mr. Birch had been away; and what pleased one so much was to see the evident pleasure of the employees in welcoming back their Manager. This was one of the companies that paid a fairly good dividend considering war time; and one reason for this was perhaps that the Directors were a body of experts, and the concern was well managed.

Mr. G. J. STAMMERS seconded the motion, which was cordially passed.

The CHAIRMAN, in reply, said that he could only say that, at the expiration of a year's anxieties and labours, it was very gratifying to receive a vote of confidence in such unanimous manner. When it reached their Manager, his colleagues, and staff generally, it would give them a great deal of pleasure. He (the Chairman) would like to add his own testimony to the fact that by the officers and staffs both in India and at home the vote was well deserved. They had some of their staff back from the war; and they were doing just as efficiently as before they went, and so had not been spoilt by their exploits on the field of heroism.

The SECRETARY said, on behalf of his colleagues and himself, he should like to thank the shareholders for their kind appreciation of their services. It was very satisfactory to hear Mr. Oke speak of the reception he received in Bombay. He (Mr. Dickson) would have much pleasure in conveying to Mr. Birch and his staff the kind vote of thanks. They had all endeavoured to do their best under the varied, exceptional, and trying circumstances. They would endeavour to do the same in the future, to which they looked forward with every confidence.

OTTOMAN GAS COMPANY, LTD.

The Ordinary General Meeting of the Company was held last Tuesday, at the London Offices, Nos. 59 & 60, Gracechurch Street, E.C.—Colonel STEPHENSON R. CLARKE, C.B. (the Chairman), presiding.

The SECRETARY (Mr. C. J. Daun) read the notice convening the meeting, and the minutes of the last ordinary and extraordinary meetings.

The CHAIRMAN then, without submitting any formal resolution, briefly explained the position of affairs in Smyrna, so far as it is at present known to the Board. He said he was afraid he had not much information to give the shareholders; but things were beginning to open out slowly. In spite of the fact that the port of Smyrna had been opened, and communication with their Engineer (Mr. Cecil Gandon) had also been resumed, they had not hitherto been able to send coal to Smyrna. But they had now, he was pleased to say, arranged for 400 tons to go out at once. This should ease some of Mr. Gandon's anxieties. Though the Directors had received letters from Mr. Gandon fairly regularly, he said that the letters written to him by the Secretary had been very irregular in reaching him. So far no accounts were to hand from Smyrna; but Mr. Gandon was having them prepared, and it was hoped they would reach the Directors before long. Another trouble with which they were faced was the exchange. At the present moment, the pound Turkish was worth only about 3s. 4d., instead of standing at over 18s.; and this condition of affairs would naturally make the conveying of funds from Smyrna (when there were any) really difficult. Up to now very little money had been sent across; but it was hoped that when peace was signed the exchange would improve. He was glad to be able to report that the Directors had

learned that the staff in Smyrna seemed, considering all things, to have had very little cause to complain of their general treatment at the hands of the Turks during the time when hostilities were being carried on. In fact, as he believed the proprietors were aware, their Engineer had found an opportunity to get married during the war. He was sure the proprietors would all be glad to have this opportunity of congratulating him and the whole of the staff at Smyrna on having safely come through this very anxious time. Everyone interested in the Company on this side had been exercised in mind during the years when no news could be obtained of those in Turkey. The plant, they heard from Mr. Gandon, was, with very few exceptions, in quite good condition. They were now supplying a small quantity of gas at a price very considerably in excess of what was charged before the war. It was a matter of regret to the Directors that they had not yet been able to get any accounts; but from Mr. Gandon's letters, they understood that he was satisfied with the Company's position. The Board had notified to the Claims Department of the Foreign Office the estimated loss accruing to the Company through the Turkish Government having joined the ranks of the enemy. He regretted that at the present moment there was no more information he could give the shareholders, but hoped at the next meeting to have something more definite and interesting to tell them.

Rising again, the Chairman moved that the retiring Directors, Mr. Arthur F. Phillips and Mr. J. Clarmont Daniell, be re-elected. He remarked that he need say nothing in favour of Mr. Phillips, who was well known to be a tower of strength to any company fortunate enough to secure his services. Mr. Daniell, who had recently joined the Board, was the son of the former oldest Director, whose loss they had had to deplore. He would certainly be of the greatest assistance to the Company.

Mr. A. M. Paddon seconded; remarking that an illimitable number of gas directors and proprietors would be competent to speak of the value of Mr. Phillips's services to any company; but in connection with a company such as theirs, confronted with so many nebulous problems and difficulties, his re-election would be an inestimable benefit. Their short association with Mr. Daniell had convinced them also that he was a Director of the greatest use.

The motion was agreed to; and thereafter the Auditors (Messrs. T. H. Cooke and F. W. Church) were re-appointed, on the proposition of Mr. A. W. Oke, seconded by Mr. W. H. Daun.

A hearty vote of thanks was passed to the Chairman, Directors, and staff.

The Chairman, in response, said it was true that they had passed through a very anxious time; but, as he had said, things were gradually opening-out, and they were very hopeful that when they met the shareholders again everything would be once more in full swing. Of course, they could say very little about the future. They did not even know yet what nation would own the town of Smyrna.

SIR HALLEWELL ROGERS'S RESIGNATION.

At a Special Meeting of the Birmingham Gas Committee on Monday of last week, the following resolution was unanimously approved, on the motion of Alderman J. H. Lloyd, seconded by Alderman Sanders:

> Resolved—"That the Gas Committee learn with deep regret of the resignation of Alderman Sir Hallewell Rogers, M.P., from the City Council, owing to the pressure of his parliamentary duties. They recall that when he was elected a member of the Council nearly 26 years ago, he was appointed to serve on the Gas Committee, of which he became Chairman in November, 1901. After serving as Lord Mayor of the city, he was re-appointed Chairman in 1904, and has since been re-elected to that important position each year—a record in the history of the department. The Committee very deeply regret his severance from the work of the Gas Department, of which he has had a long and unique experience, as his associations with the Committee, extending over so many years, enabled him to obtain a complete mastery of the inner working of the department, which, coupled with his wide commercial knowledge, wise guidance, and courtesy, made him an ideal Chairman. They sincerely wish him a speedy restoration to health, and every success in his parliamentary career.

ARSENICAL POISONING FROM COAL PRODUCTS.

A short communication by MM. Bayet and Slosse to the Paris Academy of Sciences consists of a *résumé* of clinical and chemical experiments undertaken by the authors in the course of an inquiry into the disease called "pitch disease," affecting the workmen in a briquette factory, and attributed to the pitch employed in the agglomeration of the coal dust. They found, among other symptoms, exceptional frequency of cutaneous cancer of a particularly serious form, and having, in certain cases, even fatal results. Of the workmen employed, 30 p.ct. were affected. The symptoms were found to vary very greatly; but it was possible by a clinical analysis to isolate a group of symptoms which exhibited striking similarity to those of chronic arsenical poisoning.

This conclusion, based only on clinical grounds, was subjected to chemical confirmation. It was shown that arsenic exists in the substances handled by the workmen and afterwards in their organisms. The authors were able to show the presence of arsenic in the pitch, from the distillation of the tar, in the dust of the air in the factory, in the hair of all the workmen (in appreciable quantity), and in the blood of a great number of them. It was evident that the workmen in the briquette factory were exposed to arsenical impregnation. The clinical and chemical investigations led to the same conclusion.

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The authors have arrived at the opinion that arsenical poisoning occurs among those in many occupations employing coal and its derivatives, and that to it may be traced diseases of tar distillers, asphalters, impregnators of railway sleepers and blocks, workmen in tarred paper factories, and those employed in making lamp-black. Arsenic, found in soot, in tar, and in bye-products of the latter, was constantly traced to the coal. The authors point out that the existence of coals containing arsenical pyrites has long been known; but it has not been suspected that arsenic was so widely distributed or had such pathological results. The authors refer to the observation of Manouvrier, of Lille, in 1870, by whom the expression "coal poisoning" was suggested. They consider that they are justified in going further, and in giving the name of "arsenical coal poisoning" to this group of diseases.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *May* 19.

The London market in tar products continues without particular change. Pitch is firm at over 65s. per ton in bulk at makers' works; and there is a fair amount of inquiry for next season's delivery. Toluol is from 2s. 9d. to 3s. per gallon; solvent naphtha about 2s. 6d. per gallon; creosote about 6d. to 6¼d. per gallon—all net and naked at sellers' works. Anthracene is about 7d. per unit, casks free. Pyridine is 4s. to 4s. 3d. per gallon, in buyers' drums. Crude carbolic acid 60's is about 1s. per gallon, casks free.

In sulphate of ammonia, there is nothing new to report.

Tar Products in the Provinces.

May 19.

The average values for gas-works products during the week were: Gas-works coal tar, 35s. 6d. to 40s. 6d. Pitch, East Coast, 55s. to 57s. 6d. per ton f.a.s.; West Coast—Manchester 45s. to 46s.; Liverpool, 46s. to 46s. 6d., Clyde, 52s. 6d. to 55s. nominal. Benzol 90 p.ct., North, 1s. 9d. to 1s. 11d.; crude, 65 p.ct., at 120, 1s. 1d. to 1s. 2d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 9d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk North, 7⅞d. to 8¼d. Solvent naphtha, naked, North, 1s. 10d. to 2s. 1d. Heavy naphtha, North, 2s. 5d. to 2s. 7d. Creosote, in bulk, North, liquid, 5d. to 5⅛d. Heavy oils, in bulk, North, 6d. to 6⅛d. Carbolic acid, 60 p.ct., nominally 1s. Naphthalene, £16 to £19; salts, £5 to £6, bags included. Anthracene "A" quality, 7d. to 7½d. per minimum 40 p.ct.; "B" quality, 2d. nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

The condition of the tar products markets has changed little since my last report. Production, although fairly well maintained in London, continues to decline in many Provincial centres—especially in the North, where the position of the coke-oven industry leaves much to be desired. Pitch continues a very strong market, and a large proportion of Provincial accumulated stocks has been disposed of. London is without change; while South Wales is again taking large quantities for the patent fuel business, the export side of which is expanding rapidly. Tar remains in excellent demand, and difficulty may shortly be experienced in placing business for delivery earlier than September. Benzol maintains a steady tone. Makers report that local demands continue to increase, and the Irish market is becoming of more and more importance, especially to northern makers. Creosote meets a ready demand, and some very fair shipments have been made during the last few weeks. Carbolic acid shows no signs of improvement; and it is difficult to see what can be done. Naphthalenes are inclined to a lower range of values—particularly the refined. There is only a very small business in naphthas; solvent being a trifle lower. Anthracene is rather dearer. Other products are without change.

The range of home quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 9½d. North; crude 60-65% 1s. 3½d. to 1s. 5½d.; pure, 2s. 6d. per gallon naked.

Carbolic Acid: Crude 60's unsaleable; crystals 40%, 5d. per lb. asked.

Crude Tar: London, 42s. to 44s.; Midlands, 38s. to 40s.; North 38s. per ton *ex* works.

Pitch: London, 67s. 6d to 70s. per ton; East Coast, 53s. to 55s. per ton; West Coast, 46s. to 48s., with Manchester 47s. per ton and Glasgow 47s. 6d. per ton; South Wales, 56s. to 58s. per ton.

Solvent Naphtha: London, 2s. 1d. to 2s. 4d. Provinces average 2s. 2d. per gallon.

Crude Naphtha: Naked, 10d. per gallon.

Heavy Naphtha: 2s. 4d. per gallon.

Naphthalene: Refined, £16 to £19 per ton nominal; crude, £5 10s. to £10, according to quality.

Toluol: Naked, 2s. 1d. to 2s. 3d. per gallon nominal. North 2s.

Creosote: London, 7¾d.; North, 6¾d. to 7d.; heavy oil, 7¼d. per gallon in bulk.

Anthracene: 40-45%, 6d. to 8d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95%, 2s. 9d. to 2s. 10d.; 97-99%, 2s. 11d. to 3s. 3d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

Although the position of sulphate of ammonia is at present somewhat obscure, the entire make is finding a ready market. Nothing definite

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is known of the prospects of export trade; but if last month's trade returns are any indication, increased exports are likely, coupled with somewhat lower values than of late. During April, 5846 tons, valued at £187,080, compared with 955 tons, valued at £20,434, were sent abroad. As regards the home trade, only a very substantial fall in the cost of production would enable any drop in quotations when control is removed; and substantial reductions in working costs are about the last things to be looked for in any industry, as things are to-day. Consequently, there does not appear to be any likelihood of a great change from the present level of controlled prices. In America, quotations are falling, and the product has been offered on the Pacific Coast—an important centre for the fertilizer business—at the low price of £20 per ton, with very little business passing even at this price. In France stocks are said to be fairly good; but orders have been placed in England for sulphate of ammonia for distribution in the North of France, where it is badly needed and where its value is readily realized.

Glasgow Wages Arbitration.—In a reference to the Court of Arbitration, the parties were the Corporation of Glasgow and the Municipal Employees' Association. The claim submitted was for payment to the foremen employed in the Gas Department of a total war bonus of 52s. 6d. per week over pre-war rates. The matter was referred by the Ministry of Labour to the Court of Arbitration for settlement; and representatives of the parties were heard at Glasgow on the 28th ult. The Corporation agreed in January, 1918, that the foremen in the various departments should receive the same war advances as the other employees in the departments. Under this arrangement, the foremen in the various divisions of the Gas Department have received advances, since the outbreak of the war, varying from 35s. 10d. to 44s. 7d. a week. The award of the Court was that the claim submitted had not been established.

Stourport Gas Company's Arbitration.—In a recent reference to the Court of Arbitration, the parties were the Stourport Gas, Coal, and Coke Company, Ltd., and the Workers' Union. The claim submitted was for the terms and conditions of Award No. 269 (Gas Workers) of the Court of Arbitration. The men concerned have received war advances amounting to 23s. 6d. a week (*plus* a bonus of 12½ p.ct. on earnings for time workers 21 years of age and over). The award was that the men concerned aged 18 years and over shall receive an advance of 5s. a week, payable at the rate of 10d. a day or shift for each day or shift worked. To boys and youths under 18 years of age there shall be paid an advance of 2s. 6d. a week, payable at the rate of 5d. a day or shift for each day or shift worked. The amounts thus awarded are to be taken into account in the calculation of payment for overtime and night duty, and for work on Sundays and holidays (where extra payments are made for such work). They are to be regarded as war advances, and recognized as being due to, and dependent on, the abnormal conditions prevailing in consequence of the war.

South Staffordshire Mond Gas Company.—The Company announce that, in consequence of the increased cost of manufacture, they have applied to the Board of Trade to issue an Order increasing the maximum prices of gas to a rate not exceeding 9½d. per 1000 c.ft. if the quantity taken by the consumer be not less than 4 million c.ft. per quarter, and 10½d. per 1000 c.ft. if the quantity be smaller than this.

Trouble at the Ormskirk Gas-Works.—Recently the stokers at the Ormskirk Gas-Works came out on strike, over the question of shifts, and on being ordered to resume work by their Union they refused. However, the Engineer and Manager (Mr. W. M. Carr), who had just returned from Archangel on demobilization, and the office staff, took turns at the retorts; and steps were immediately taken to fill the vacancies. Mr. Carr declared that the Company were paying wages according to the settlement arranged by the Union and the National Gas Council, and that the men were not justified in their attitude.

Gas Estimates at Manchester.—The report of the Finance Committee of the Manchester Corporation, which will be presented at a meeting of the Council to-morrow (Wednesday), states that the sum required to be raised in the current year's rate will be £2,215,938, an increase of £487,174 as compared with last year. The estimates of the Gas Committee for street lighting show an increase of £42,488 over the amount paid out of the city fund last year. This increase is due to the partial removal of the restrictions on street lighting, and to the increased wages of workmen, cost of materials, and gas.

Gas-Workers' Hours.—At a meeting of gas workers held last Sunday morning at the East Ham Town Hall, the settlement arrived at for the reduction of gas-workers' hours to 47 per week, with no change in the rate of normal weekly pay for other than shift men, whose rate will be increased by 6d. per shift, was accepted. It was stated by the representatives on the Joint Industrial Council that in some cases this meant a reduction of seven hours a week, but in others only one hour. Mr. Jack Jones, M.P., said that they had accomplished for the first time the getting of the whole of the employers on one level so far as hours were concerned. Every gas undertaking in the country had given a definite pledge to introduce shorter hours at the earliest opportunity.

The Fletcher new externally heated "Gas-Kitchener" is described in a pamphlet prepared by Messrs. Fletcher, Russell, & Co., Ltd., of Warrington. It will be recalled that an account of this series of cooking ranges and ovens was recently given in our pages [see "Journal," March 4, p. 445]. In their pamphlet, the firm reproduce the results of actual tests of the oven for roasting and for bread and pastry. The following are the figures for roasting a leg of mutton: Time, 2 hrs. 10 min.; gas, 29·5 c.ft.; weight of joint before roasting, 5 lbs. 8¼ oz.; after roasting, 4 lbs. 13 oz.; weight of dripping, 4¼ oz.; loss, 6¾ oz. Another leaflet sets forth, in readable form, reasons for the use of gas in preference to coal.

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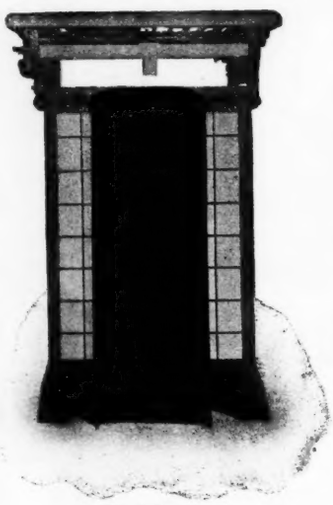

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Stafford Gas Undertaking.

The annual report and statement of accounts of the Stafford municipal gas undertaking show that the works are in very good order. Though the Committee had spent more money than usual on repairs, they had been able to produce something like 12,300 c.ft. of gas per ton of coal, as compared with 11,400 c.ft. per ton in the previous year. This means that, had the works only produced the same quantity of gas as in the previous year, they would have used 1750 more tons of coal. For the year ended March 31, the income from the sales of gas brought in £43,286—an increase of £8163. The amount received from residuals was £16,706—a decrease of £316; the total income from all sources for the year was £60,136—an increase of £7816. The total expenditure was £52,717—an increase of £7493, of which no less than £5402 was due to increased wages. After providing £1296 for depreciation, there was a balance of £6123—an increase of £253. The net available balance was £987—a decrease of £186. Of this, the sum of £800 will be handed over in relief of the rates, against £1000 last year. The Gas Committee have not raised the price of gas more than they were compelled to; and they anticipate that, with the new plant, there will be no necessity to advance the price during the ensuing year. The Committee, with the approval of the Council, have increased the salary of the Gas Engineer (Mr. W. M. Valon) from £650 to £800 per annum—£750 being in respect of salary and £40 war allowance. The increase is retrospective from April.

Proposed New Gas-Works for Carlisle.—The Gas Committee of the Carlisle Corporation have decided to recommend the City Council to erect new and up-to-date gas-works on Boustead's Grassing, at a cost of £250,000, to replace the present works, which have long been obsolete. The report of the Gas Engineer (Mr. J. E. Blundell) on the scheme has been generally approved by Mr. W. Newbigging, of Manchester. It is pointed out that the new works will effect an annual saving of £16,486 on the present production; and deducting from this £14,570 for interest and sinking fund charges, there is a net gain of £1916 a year, which will be materially augmented as the consumption of gas increases.

Leicester Corporation Gas Accounts.—The analysis by Mr. Hubert Pooley (Engineer and Manager) of the accounts of the Leicester Corporation Gas Department for the year 1918, shows an outstanding capital of £925,154, equal to £5 8s. 6d. per ton of coal carbonized, and 7s. 11d. per 1000 c.ft. of gas sold. The total make of gas was 2,410,801,000 c.ft., or 14,142 c.ft. per ton of coal carbonized. Unaccounted-for gas amounted to 3·2 p.ct. For each ton of coal carbonized, there was a sale of 12·9 cwt. of coke. The net proceeds of residuals on the cost of coal was 61·4 p.ct. There was a net profit on working for the year of £26,483; and of this, £18,000 was allocated to the reserve fund, and £8483 to the general district rate.

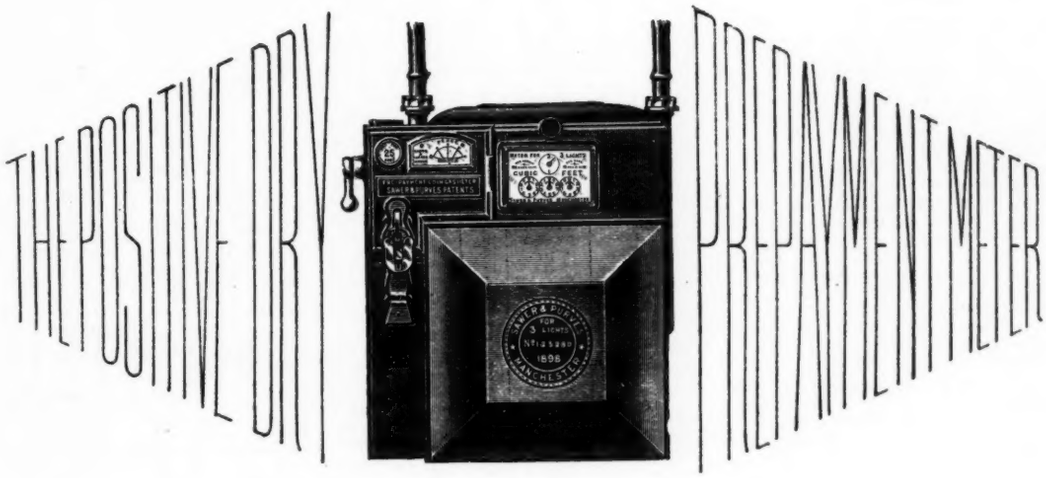
Southampton Gas Company.

It was stated by the Chairman (Captain A. J. Corse-Scott, J.P.), at the half-yearly meeting of the Southampton Gas Company, that in 1910 the capital expenditure per million c.ft. of gas sold was £903, whereas to-day it was only £670. On the present occasion, there was a slight increase of 2·82 p.ct. in gas sales, solely due to the shortage of coal among the smaller class of consumer. The Company had, with other neighbouring works, joined the South-Western Tar Distilleries; and since the accounts were published, a cheque for £1100 had been received from the distilleries, representing the Company's share of the balance divisible between the undertakings that had joined the scheme. The increase in cost of coal averaged 5s. 1d. per ton; and oil cost 7d. per gallon more than in 1917. Wages and materials had further advanced since the last meeting. Labour would increase still more; and materials were even now advancing in price. The increase in expenditure was £19,917, and the gross profit £5739; while the net profit was only £2624. In order to pay the full dividend allowed, a sum of £9520 would be taken from the reserve fund. He should, perhaps, explain the reason why, in view of the increase in the price, it had been found necessary to draw from the reserve fund. Application was made to the Board of Trade for authority to increase the price 1s. 3d. per 1000 c.ft.; but after very considerable delay, the Board of Trade would only grant an increase of 10d. Hence the inadequate profit for the half year. The increase in the price of gas had only been for the last three months of the year. The outlook for the future was much brighter; and without undue optimism, the Directors felt they could assure the stockholders of better times. The report was adopted, and a dividend for the half year at the rate of 3¾ p.ct. was declared.

Export of Coal.—In conformity with the policy of relaxing controls and facilitating the return to normal conditions, certain changes have recently been made in the conditions affecting the sale of coal for export. It is now proposed, *inter alia*, to terminate the system of limited prices at present in operation in the case of coal shipped to France, Italy, and other Allied countries.

Dukinfield Gas Department.—The accounts of Mr. William Lindley, the Manager of the Borough of Dukinfield Gas Department, for the year ended March 31, show that the sales of gas amounted to 86½ million c.ft., which was an increase on the preceding year of 500,000 c.ft. The working resulted in a gross profit of £2845, and a loss of £907; while for 1917-18 there was a gross profit of £2657, and a loss of £749. The make of gas per ton of coal carbonized was 11,201 c.ft., compared with 11,166 c.ft. for the year before; and the percentage unaccounted for was 9·4 and 10·85 respectively. The net cost of gas per 1000 c.ft. sold, exclusive of capital charges, was 2s. 11·25d. in the year under review, as against 2s. 4·97d. a year ago; the total cost figuring at 3s. 9·64d. and 3s. 2·48d. respectively.

SAWER & PURVES,



MANCHESTER & NOTTINGHAM.

Torbay and Dart Paint Company, Ltd.—A Company bearing this title has been registered, with a capital of £25,000, in 300 ordinary shares of £50 each, and 10,000 preference shares of £1 each.

Sequel to Nechells Gas Accident.—It has been decided to form a Rescue Department in connection with the Birmingham Fire Brigade, as the immediate result of the Nechells gas accident, in which four men, including two firemen, lost their lives. Mr. Heath informed the Watch Committee that suggestions had been made that the Gas Committee and the Fire Brigade Committee should co-operate with a view to the formation of such a department, consisting of men properly trained and equipped to render assistance in the event of future accidents. But it was now deemed advisable to adopt the recommendation of Sir John Cadman, Professor of Mining at the University of Birmingham, and to make use of the organization of the Fire Brigade—the rescue team to be part of the brigade. The Watch Committee further agreed that, in addition, teams should be formed from among the employees at the various gas-works of Birmingham, so that in case of necessity trained men would be on the spot at each works to deal with any emergency.

Fatal Accident at the Vauxhall Gas-Works.—Mr. Ingleby Oddie held an inquiry at the Lambeth Coroner's Court into the death of James Evans, a machinist employed at the South Metropolitan Gas Company's works at Vauxhall, who was killed by revolving shafting. Evidence was given that his domestic circumstances were unpleasant; but he had never threatened to commit suicide. Robert M'Kinley, foreman, stated it was part of deceased's duty to lubricate the shafting by filling the cups with oil. He should have used a ladder for the purpose of reaching the shafting overhead, and have seen it was done before the engine was started. Shortly after three o'clock on the afternoon of the accident he was called, and told that deceased was being whirled round the shafting. The engine was stopped, and deceased was brought down quite dead. The cups on the shaft had subsequently been examined; and they needed no oil. The ladder was not in position, and deceased must have climbed on the machine to reach the shaft. Everything was in order. The Coroner, in summing up, said that if it was a case of suicide, it was the most original method he had heard of in the whole course of his career. The Jury returned a verdict of "Accidental death."

STOCK MARKET REPORT.

Business on the Stock Exchange last week was animated and bright, and markets in general, of all sorts from the choicest gilt-edged commodities down to the more sporting speculative wares, had a flowing tide of continually rising prices.

Home Government issues were in high favour. Consols emerged from their recent cloud and made upward bounds almost daily, culminating on Friday with many bargains at 57¼. War Loans took the same line, and the 5 p.ct. marked 94⅜. Indians and Colonials also rose. Home Rails were rather dull, but seemed better inclined at the close. Argentines were cheered by labour and rates' prospects. In the Foreign Market, French Loans were firmer in spite of the falling exchange, and Chinese, Japanese, and Brazilian did well. But Russians found no friends. In Miscellaneous, there was vast activity in many lines; Oils, Textiles, Breweries, and Tobacco being among the liveliest.

Business in the Gas Market well maintained its volume of transactions in the aggregate, albeit they were most unevenly distributed. At least 50 p.ct. of the issues dealt in were limited to one single bargain apiece. Consequently *per contra* there was heavy pressure on others. Imperial Continental was far and away the leader in this respect; and it showed great steadiness in its daily progress to higher and higher figures. On Monday, 130-134 was the range, on Tuesday 132-135, on Wednesday 133-135, on Thursday 133½-135¼, and on Friday 133½-136; the final quotation showing a rise of 4. Primitivas took a rest after their recent activity, and were quiet and firm. The Metropolitan Companies showed no change, and Suburbans were similarly left standing. Moderate advances in quotation were in Alliance and Dublin, Bournemouth, Cape Town, Monte Video, and San Paulo.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 61¼, 62, 62¾, ditto debenture 57, 58, Imperial Continental 130, 131, 131¼, 131½, 131⅝, 132, 132½, 133, 133¼, 134, Lea Bridge 90½, Primitiva 33s. 9d., 35s., ditto preference 55s., 55s. 7½d., 57s. 6d., 58s. 9d., South Metropolitan 62, Cheltenham 5 p.ct. 78, 78½. On Tuesday, Brentford "B" 71, Gas Light ordinary 61½, 62, ditto preference 71½, ditto debenture 57, Imperial Continental 132, 132⅜, 133, 133½, 134, 134½, 135, Lea Bridge 91, Primitiva 33s. 9d., South Metropolitan 62, 62⅜, Southampton 70, ditto debenture 65½. On Wednesday, Cape Town 5, Gas Light ordinary 61½, 62, ditto maximum 55⅜, ditto preference 70½, 70⅜, ditto debenture 57, Imperial Continental 133, 133½, 134, 134½, 134⅝, 135, Primitiva 35s., 36s., ditto preference 57s., 60s., 60s. 10½d., South Metropolitan 61½, 62¼. On Thursday, British 31¼, Gas Light ordinary 61½, 61⅝, 62, ditto maximum 55½, ditto preference 70⅜, 71, 71½, ditto debenture 57, Imperial Continental 133½, 134, 134½, 135, 135½, Newcastle 67½, 68, Primitiva debenture (1911) 50, South Metropolitan 61⅜, 62½, Crowborough 44½, 45. On Friday, Aldershot preference 65, Bombay 6¼, Buenos Aires 51, Commercial 4 p.ct. 62, European 12½, Gas Light ordinary 61¼, 61½, 61⅝, 62, ditto maximum 56½, ditto preference 70¼, 70½, 71, 71¼, ditto 10 p.ct. bonds 170⅜, Imperial Continental 133½, 134, 134½, 134⅜, 135, 135½, 135⅝, 136, Primitiva preference 59s. 3d., 60s., 62s. 6d., South Metropolitan 62⅜, South Suburban 78, North Middlesex 5 p.ct. preference 80.

In the Money Market, rates were steadier and ruled firm throughout the week. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
189,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	62—67	65
1,551,868	"	April 8	2½	2⅞%	Alliance & Dublin Ord.	59—64	60 - 63	..
374,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	61—63	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6	5⅞—6¼	6¼
50,000	10	Feb. 26	16	12½%	Bournemouth Gas and Water { 10 p.c.	25—30	20—23	..
868,110	10	"	7	7%	B 7 p.c.	15—15½	10½—11½	..
115,000	10	"	6	6%	Pref. 6 p.c.	13½—14	9½—10	..
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68	..
993,045	Stk.	Feb. 26	14	37/-	Brentford A Consolid.	361—366	76—79	..
784,980	"	"	11	31/8	Do. B New	304—309	70—75	71
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	78—83	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	65—67	..
217,880	"	Feb. 26	11	7½%	Brighton & Hove Orig.	208—218	137—142	..
344,200	"	"	8	5½%	Do. A Ord. Stk.	154—159	94—99	..
933,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	10%	British	44—45	30½—31½	31½
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—53	51
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1½—2½	4⅝—5½	5
160,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7½—8½	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,513,980	"	Feb. 12	5/9/4	80/-	Commercial 4 p.c. Stk.	108—108	62—65	62
560,000	"	"	5½	26/3	Do. 3½ p.c. do.	103—105	59—62	..
475,000	"	June 11	8	8%	Do. 5 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	48—53	..
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	..
51,600	Stk.	Aug. 29	14½	12½%	Croydon A 10 p.c.	..	155—165	..
278,400	—	"	11½	9½%	Croydon B and C 7 p.c.	..	130—135	..
499,270	Stk.	—	6	5½%	Derby Con. Stk.	128—135	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,009,180	10	July 29	10	5/0	European, Ltd.	17¼—18	12½—13½	12½
16,998,975	Stk.	Feb. 10	4/17/4	80/-	Gas { 4 p.c. Ord.	98—102	61—63	61½—62½
2,600,000	"	"	8½	26/8	Light { 8½ p.c. max.	76—79	55—57	55½—56½
4,003,235	"	"	4	4%	and { 4 p.c. Con. Pref.	96—99	70—72	70½—71½
4,674,850	"	June 11	8	8%	Coke { 8 p.c. Con. Deb.	72½—74½	56—58	57—58
180,000	"	"	10	10%	10 p.c. Bonds	..	..	170⅜
82,500	"	Mar. 12	5	4½%	Hastings & St. L. 5 p.c.	..	59—64	..
258,740	"	—	3½	2½%	Do. 3½ p.c	37—39	44—49	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	16½—16¾	7—8*	..
86,600	Stk.	Sept. 12	9	8½%	Hornsey 7 p.c.	..	115—120	..
181,000	"	Mar. 12	7½	5½%	Ilford A and C.	151—154	90—95	..
65,780	"	"	6½	4½%	Do. B	115—118	69—74	..
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	132—137	130—136
1,235,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—88	72—74	..
985,349	"	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	50—95	90½—91
2,498,905	"	Feb. 26	10	49/6	Liverpool 5 p.c. Ord. A	211—213	..	..
					B	146—148	..	..
806,088	"	June 26	4	4%	Do 4 p.c. Pr. Deb. Stk.	..	..	..
155,736	"	Feb. 17	7/5/6	35%	Maidstone 5 p.c.	..	58—63	..
75,000	5	June 11	5	5%	Malta & Mediterranean	4½—4¾	3½—3¾	..
350,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	90—97	..
541,980	20	May 26	4	4%	Monte Video, Ltd.	11½—12	14—16	..
1,575,892	Stk.	July 29	4½	3½%	Newcastle&Gateh'd Con.	98—99½	67—69	67⅞—68
529,705	"	June 26	8½	8½%	Do. 8½ p.c. Deb.	82—83	57—59	..
55,940	10	Feb. 26	7/14/0	7/0	North Middlesex 7 p.c.	14—15	9¼—9¾	..
300,000	Stk.	May 14	8	5%	Oriental, Ltd.	117—122	101—104*	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4⅜—5¼	..
60,000	50	Feb. 26	18	7½%	Portsea, Island B	128—131	76—81	..
100,000	50	"	12	6½%	Do. C	118—121	68—73	..
249,980	5	April 29	8	—	Primitiva Ord.	3½—3	1½—2	33/9—36/-
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	2½—3½	55/—62/6
521,500	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	74—76	..
600,000	Stk.	July 31	4	4%	Do. " 1911	..	50—53	50
848,198	"	June 26	4	4%	River Plate 4 p.c. Deb.	86—87	48—52	..
150,000	10	May 14	6	6%	San Paulo { 5 p.c. Pref.	10½—11	7⅞—8	..
125,000	50	July 1	5	5%	5 p.c. Deb.	4½—49	41—43	..
135,000	Stk.	Mar. 12	10	5%	Sheffield A	228—234	80—84	..
209,984	"	"	10	5%	Do. B	228—234	80—84	..
529,500	"	"	10	4½%	Do. C	220—222	71—74	..
153,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
99,000	10	May 26	9	6/-	South African.	10½—11½	13—14	..
6,009,895	Stk.	Feb. 10	5/4/0	80/-	South Met. 4 p.c. Ord.	111—113	61—64	61½—62½
250,000	"	July 12	—	3%	Do. Pref.	..	96—98	..
1,696,445	"	July 10	8	3%	Do. 5 p.c. Deb.	73½—74½	54—56	..
234,290	"	Feb. 26	5½	5½%	South Shields Con. Stk.	154—159	99—101	..
969,796	"	"	6	3½%	S'th Suburb'n Ord. 5 p.c.	114—116	76—79	78
167,588	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	89—92	..
647,740	"	May 14	7½	3%	Southampton Ord.	99—109	67—69*	70
121,975	"	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	..	64—66	65½
190,000	"	Feb. 12	—	4½%	Tottenham { A 5 p.c.	185—189	90—95	..
729,275	"	"	6	3½%	District { B 5½ p.c.	115—117	65—67	..
181,955	"	June 26	4	4%	{ 4 p.c. Deb.	87—89	55—57	..
189,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
926,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109	83—85	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	"	Feb. 26	8⅜	55/-	Wandsworth A 5 p.c.	151—156	88—93	..
255,686	"	"	6¾	40/-	Do. B 5½ p.c.	129—134	68—73	..
108,075	"	"	—	38/6	Do. C	..	68—73	..
140,865	"	"	—	38/6	New Ordinary	..	68—73	..
853,000	"	"	6⅓	38/9	Wimbledon 5 p.c.	117—122	68—73	..
98,000	"	"	6¾	40/-	Epsom 5 p.c.	121—126	70—75	..
88,416	"	June 26	8	8%	5 p.c. Deb. Stk.	68—69	50—52	..

*Ex Div.

Messrs. Bale and Hardy, Ltd., of No. 39, Victoria Street, S.W., have received orders for Tully's carburetted hydrogen plants for Grantham (300,000 c.ft. per day capacity), East Grinstead (200,000 c.ft.), and Sandown (100,000 c.ft.).

The Directors of the Monte Video Gas Company, Ltd., recommend a final dividend of 14s. per share, or 3½ p.ct., free of income-tax (at the rate of 5s. 9d. in the pound) for the half year to Dec. 31 last, as compared with a dividend of 6s. per share, or 1½ p.ct., less income-tax, declared for the corresponding period of the previous year.

The Burgh of Hamilton have decided to fit up the remainder of their gas-lamps with "A. & M." patent pressure-wave automatic controllers. This will mean a further 856. In Hamilton they have already 290 lamps fitted with these controllers, which have been in operation for the past two years; and they proved of valuable assistance during wartime.

The Bradford Gas Committee, having received a report from the Engineer (Mr. Charles Wood) that the Eccleshill and Clayton district gas-works will not be required again for gas making, but only for storage and distribution, have decided to dismantle the production part of the works this year. These works were bought some years ago from private companies.

"Cooking by Gas," containing instructions how to use a gas-oven with satisfaction, by Mr. R. Gamble Marks, of Southport, lecturer, demonstrator, and specialist in gas-oven management, has reached its sixth edition. The price is 6d., or by post 8d. There are a large number of attractive recipes, and many testimonials recording satisfaction with the use of Mr. Marks's "Excelsior" covered tin.

James Skerratt, aged 37, a recently demobilized soldier, living at Levenshulme, Manchester, was accidentally poisoned by gas at his home last Sunday week. On examination, it was found that the gas tap was very loose; and it was suggested that, after turning out the light, the deceased must have accidentally caught the tap and turned on the gas again. At the inquest, a verdict of "Accidental death" was returned.

The Local Government Board are issuing, at the price of 1d. net, a booklet on "Housing by Public Utility Societies," which describes in simple terms how small groups of people—whether of workers, of workers acting jointly with employers, or of other individuals—may band themselves together for the purpose of promoting housing schemes and obtaining financial assistance from the State. It is felt that, with the facilities the Government propose to give, such groups of people may do much to supplement the work of local authorities, and help towards a solution of the housing shortage.

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See Illustrated Advertisement, Feb. 25, p. 410.

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"BRADDOCK, OLDHAM," and "METRIQUE, LAMB, LONDON."

BENZOL PLANTS FOR GAS-WORKS.

BAGLEY, MILLS, & CO., Ltd.,
92, Victoria Street, Westminster, S.W. 1, Invite inquiries from all Gas-Works making 75 million cubic feet and upwards per annum.

SULPHATE OF AMMONIA
SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CHEMICAL PLANT ENGINEERS, BOLTON, LANCS.
Telegrams—"SATURATORS, BOLTON." Telephone 0848.

MEWBURN, ELLIS, AND PRYOR.
CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70, Chancery Lane, London.
Telegrams: "Patent, London." 'Phone: 243 Holborn.
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

SEND your inquiries for Carburetted HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS to—
BALE AND HARDY,
39, VICTORIA STREET, WESTMINSTER, S.W. 1.

'FERROX." "FERROX." "FERROX."

A BRITISH Oxide Cheaper and Better than Bog Ore. 35 per cent. Water, 75 per cent. Ferric Hydrate.
For Sale outright or on Loan.
OXIDE LIMITED, Brentford, MIDDLESEX.

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SPENT OXIDE BOUGHT.

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Tins for Sale to Consumers.
In Bulk for Works Use.

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SPECIALLY prepared for the manu- facture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD., Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—1588 AVENUE (5 lines).

BRITISH GAS PURIFYING MATERIAL.

ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Chief Proprietor and Managing Director.)
13, ARCADIAN GARDENS, WOOD GREEN, LONDON, N. 22
Telegrams: "Brigurimat, Wood, London."
'Phone: Palmer's Green 608.

EXTENSIONS.—Gas-Works requiring Alterations or Additions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, 15, Park Row, Leeds, who make a Speciality of Gas Apparatus, Coke-Oven Plant, and Structural Steel Work. Inquiries Solicited. Satisfaction Guaranteed. Telephone No. 23579, LEEDS.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, Rose Mount Ironworks, Elland.

J. E. C. LORD, Ship Canal Tar-Works, Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid Carbolic Acid, Sulphate of Ammonia, &c.

TAR AND GAS LIQUOR WANTED
IN LONDON DISTRICT.

THOMAS CLAYTON (Oldbury), Ltd.,
BRENTFORD, W.
Telegrams: Canal, Brentford. 'Phone: Ealing 17.

PATENTS — Inventors, Advice and Handbook free.
King's Patent Agency, Ltd., 165, Queen Victoria Street, London, E.C. 4.

A REPRESENTATIVE of a Colonial Gas Company is now in England, and WILL BE GLAD TO RECEIVE PARTICULARS OF ANY NOVELTIES IN GAS APPLIANCES.
Address, "C. D.," care of Messrs. John Terry & Co., 7, Great Winchester Street, E.C. 2.

APPOINTMENTS, &c., WANTED.

WHEN Filling Vacancies, please REMEMBER THE CLAIM OF THE EX-SERVICE MAN, who, other Qualification being equal, has the FIRST CALL ON YOUR CONSIDERATION.

COOKERY Lecturing and Advisory WORK.—First-Class Diplomée of National Training School of Cookery, with 14 Years' Experience in all Branches of Cookery Lecturing, desires Change. Travelling or South of England preferred. French spoken.
Address No. 6609, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

ADVERTISER (ex-Officer), desiring Change. Seeks Position as SECRETARY or ACCOUNTANT. Practical Knowledge of Gas Company's Accounts, Distribution, and General Management. Fourteen Years with present Company (120 Millions). Age 31.
Address No. 6663, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

GENTLEMAN, with extensive Practical Experience in Gas-Works Construction and General Engineering, would be pleased to REPRESENT a Firm of Gas-Works Contractors in following-up Inquiries, and Visiting Work under Erection, &c. Highest References.
Address, No. 6664, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

GOOD Agencies wanted by Advertiser (Experienced) for the Sale of Requirements of GAS, WATER, and GENERAL ENGINEERING CONCERNS.
Address, No. 6668, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED—A Permanent Situation as GAS-FITTER. Over 20 Years' Practical Experience with Iron and Compo. and the General Routine of a Small Works.
Address, stating Wages, to No. 6665, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

APPOINTMENTS, &c., VACANT.

RYDE GAS LIGHT COMPANY.

APPOINTMENT OF ENGINEER AND MANAGER.

THE Directors beg to Thank Applicants for the above Appointment, and to inform them that the VACANCY HAS BEEN FILLED.
A. E. Coombes,
Secretary.
Gas-Works, Ryde,
May 13, 1919.

THE British Gas Light Company, Ltd., require an ENGINEER and MANAGER for their Staffordshire Potteries Station. Age not to exceed 40 Years.
Commencing Salary, £700 per Annum, with House and other Privileges.
Applications, stating Age, Qualifications, and Experience, and accompanied by *copies* of recent Testimonials, to be addressed to the Secretary at the Chief Office of the Company not later than Monday, the 26th of May.
Chief Office, 11, George Yard,
Lombard Street,
London, E.C. 3. May 12, 1919.

CHESTERFIELD GAS AND WATER BOARD.

APPOINTMENT OF GAS ENGINEER AND MANAGER.

APPLICATIONS are invited from Fully-Qualified Persons for the Position of GAS ENGINEER and MANAGER, at a commencing Salary of £600 per Annum.
Terms of appointment may be obtained from the undersigned on receipt of stamped addressed envelope.
Applications, stating present Position, Experience, Qualifications, Age, and accompanied by not exceeding three Testimonials, must be Delivered to the undersigned, marked "Gas Engineer," on or before the 31st of May, 1919.
Canvassing members of the Board directly or indirectly will be a disqualification.
Jas. H. Rothwell,
Law Clerk.
May 10, 1919.
2, Gluman Gate,
Chesterfield.

MANAGER'S Assistant Wanted, Experienced in Water-Gas Manufacture. Must be good Chemist.
Apply, by letter, stating Experience, Age, and Salary required, to No. 6658, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED—An Assistant Manager for Tar-Works in the South. Must have Engineering Knowledge. Commencing Salary, £500 per Annum. Applications can only be considered from those who can furnish satisfactory record of Overseas Service.
Apply, by letter, to No. 6661, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

SHEFFIELD GAS COMPANY.

THE Directors of this Company require a SUPERINTENDENT for their Neepsend Gas-Works, where the annual make of gas is about 3000 Million Cubic Feet.
Candidates must have a sound knowledge of Carbonization and have had a good Technical Training.
Commencing Salary, £300 per Annum, and War Bonus of £65 per Annum, with House near the Works, Rent and Rates Free.
Applications, marked "Superintendent," stating Age, whether Married or Single, and previous Experience, to be made by letter only, addressed to Mr. Ralph Halkett, General Manager, and Delivered by post not later than Monday, the 26th inst.
Wm. Hamby,
Secretary.
Commercial Street, Sheffield,
May 9, 1919.

MECHANICAL Draughtsman or ASSISTANT ENGINEER Required for the North of England. Must have Experience of Mechanical Producers.
Apply, by letter, to No. 6660, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

DRAUGHTSMAN, Estimating, required by Constructional and General Engineers in the Birmingham District. Experience in Gas-Works and/or Coke-Oven Plant a Recommendation.
Apply by letter, stating Age, Experience, and Salary required, to No. 6662, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

ALDERSHOT GAS, WATER, AND DISTRICT LIGHTING COMPANY.

AUDIT Accountant.—Qualified Man —Experience in Gas, Water, and Electricity Accounts preferred, but not absolutely essential. Submit *copies* of three recent Testimonials, with full Particulars of Experience, Age, and if Married. Salary commencing £200 per Annum, *plus* 12½ p.ct. War Bonus (Free of Income-Tax), and Co-partnership according to scale.
By Order,
W. Fish,
Secretary.
Chief Office,
Victoria Road,
Aldershot, May 14, 1919.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

GRANTON WORKS.

MANAGING Foreman wanted to Take Full Charge of the Granton Works, under the Direction of the Engineer and Manager.
Applicants must have had a Mechanical Training and be thoroughly Experienced with every Detail of the Equipment of a Large Modern Gas-Works, and Competent to Supervise the Daily Routine in all its Ramifications, as well as the Supervision of the Annual Repairs and Renewals, all of which are carried out by the Commissioners' own Staff.
Applications, giving a *resume* of the Early Training and Past Experience, setting forth in Detail the Types of Carbonizing and other Plant with which the applicant has had Experience, together with *copies* of Testimonials, stating Age (which must not exceed 40) and other Particulars, are to be addressed to the undersigned on or before Saturday, *June 7*, 1919.
Salary, £300 per Annum, with House, Coal, and Gas.
As the appointment is due to retiral, owing to the present occupant having arrived at the pension age, the Position will become Vacant about the end of July.
Canvassing any member of the Commission is strictly prohibited.
Alexander Masterton,
Engineer and Manager.

WANTED, for large Gas-Works in Ireland, a thoroughly Competent FOREMAN MECHANIC, to Take Full Charge of Shop, Gas, Steam, and Electrical General Repairs.
Apply, by letter, with References, stating Age, Experience, and Salary expected, to No. 6655, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED—Good Carbonizing ForeMAN, accustomed to Regenerative Furnaces, Sulphate Making, and General Gas-Works routine. Wages, £4 5s. per Week.
Apply, stating Age, Experience, &c., with *copies* of One or Two recent Testimonials, to W. T. Buckland, Gas-Works, Chesterfield.

WORKS Foreman for 350 Millions Gas-Works in Midlands. Mechanical training preferred. Knowledge of Verticals and "D. B." Machines an advantage.
Apply, by letter, giving Particulars of Experience, together with Age and Wages required, to No. 6657, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED — Fully Experienced CarBONIZING FOREMAN (Eight-hour Shifts) for large Provincial Gas-Works in South. Modern Practice. Wages, £3 19s. per Week, *plus* 12½ p. ct.
Apply, by letter, stating Age and Experience, to 6667, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

RETORT-HOUSE Foreman required by a Gas-Works in the South of England producing over 800,000,000 c.ft. per Annum. A Good Wage will be paid. Eight-Hour Shifts. Only those who are thoroughly Experienced in Retort-House Work need apply.
Applications, stating Age and Experience, to be sent as soon as possible to No. 6666, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

GAS-FITTER.

WANTED—for a Gas-Works in South America, an Experienced FITTER. Must be a Good Worker in Iron and Compo., for general inside and outside Lighting, and be used to Fixing and Adjusting all Descriptions of Gas Heating Apparatus and High-Pressure Lighting. Three Years' Agreement. Wages, £21 sterling per Month.
Full Particulars as to Age, Experience, whether Married or Single, &c., to be lodged by May 31. First-Class References Indispensable. Address "A. Z.," 32, Clements Lane, E.C. 4.

GAS-FITTER wanted. All-round Experience.
Apply, stating Wages, Age, Experience, &c., to the Manager, Gas-Works, Sidmouth.

WANTED. — Competent Dry and Wet GAS-METER REPAIRERS. Standard rate of Wages paid.
Barnsley Gas Company, Pontefract Road, Barnsley.

SULPHATE OF AMMONIA.

WANTED, at a Large Gas-Works in the South of England, a Man used to Making Sulphate of Ammonia. Good Wages and Permanent Situation to Suitable Man.
Send Particulars of Experience and References to No. 6659, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

MACHINE Attendant wanted for Retort-House Stoking Machine. De Brouwer Charger, Eight Hour Shifts. Must have knowledge of Gas-Engine.
Apply, stating Wages required, to J. B. Balmforth, Engineer, Gas-Works, Bingley.

WANTED—Two Reliable Men as GAS STOKERS (Shovel Charging), and to make themselves Generally Useful in a small Works.
Apply, stating Age, Experience, and Wages required, to W. T. Bark, Manager, Gas-Works, Tenterden, Kent.

METER Repairers Wanted.—Wages, for 47 hour Week, £3 13s. 2½d. One Week's Holiday per Annum with Pay.
Applications, with full Particulars of Experience, to the Engineer and Manager, Gas-Works, Halifax.

PLANT, &c., FOR SALE & WANTED.

FOR SALE—Two Spiral-Guided GasHOLDERS, with STEEL TANKS, Inlet and Outlet Pipes, and Valves. Capacity, 250,000 c.ft. Size of Tank, 86 ft. 8 in. dia. by 24 ft. 6 in. deep. Pressure of both Lifts 7 in. Ordered for Government Factory not now required. Ready for Delivery.
Prices, Plans, and Specifications will be forwarded on Application to Ashmore, Benson, Pease & Co., Ltd., Stocton-on-Tees.

WANTED—Set of Four Purifiers, 12 ft. to 16 ft. square.
State Condition and Price, either as they stand or loaded, to No. 6651, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WANTED—Two Purifiers, 6 ft. to 10 ft. square, and small SULPHATE of AMMONIA PLANT—Half Ton or so per day.
State price to No. 6652, care of Mr. King, 11, Bolt Court, Fleet Street, E.C. 4.

WIGAN CORPORATION.
(Gas Department.)

THE Wigan Gas Committee are prepared to Consider OFFERS from Manufacturers of GAS COOKING and HEATING APPLIANCES desirous of Opening Show-Rooms in the Borough and of Supplying such Appliances for a period of years.
Early Application for Particulars to be made to the Engineer, Gas-Works, Wigan.